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# AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

## Air Force Systems Command

## AFOSR

## TECHNICAL REPORT SUMMARIES

OCTOBER — DECEMBER 1983

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PREPARED BY:

BARBARA WERT, CHIEF

TECHNICAL DOCUMENTS SECTION

AFOSR/XOTD

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# INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

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# PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.

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AFOSR awards grants and contracts for research in areas of science relevant to the needs of the Air Force. Research is selected for support from unsolicited proposals originating from scientists investigating problems involving the search for new knowledge and the expansion of scientific principles. Selection is on the basis of scientific potential for improving Air Force operational capabilities, originality, significance to science, the qualification of the principal investigators, and the reasonableness of the proposed budget.

## KEY TO READING THE DATA

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DTIC Report Bibliography – DTIC's brief description of a technical report.

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Field & Group Numbers – (appearing after the AD number) First number is the subject field and the second number after the slash is the particular group under that subject field.

Corporate Author/Performing Organization – The organization; e.g., college/university, company, etc., at which the research is conducted.

Title – The title of the technical report.

Descriptive Note – Gives the type of report; e.g., final, interim, etc., and the period of the time of the research.

Date – Date of the technical report.

Pages – Total number of pages contained in the technical report.

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Contract/Grant Number – The instrument control number identifying the contracting activity and funding year under which the research is initiated.

Project Number – A number unique to a particular area of science; e.g., 2304 is the project number for mathematics.

Task Number – An alphanumeric number unique to a specific field of the main area of science; e.g., 2304 is the project number for mathematics and A3 is the task number for computational sciences.

Monitor Number – The number assigned to a particular report by the government agency monitoring the research. The number consists of the government monitor acronym, the present calendar year and the technical report assigned consecutively; e.g., AFOSR-TR-83-0001 is the first number used for the first technical report processed for Calendar Year 1983.

Supplementary Note – A variety of statements pertaining to a report. For example, if the report is a journal article, the supplementary note might give you the journal citation, which will include the name of the journal the article it appears in, and the volume number, date, and the page numbers of the journal.

Abstract – A brief summary describing the research of the report.

Descriptors – Key words describing the research.

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AD-A131 670

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AD-A133 947

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AD-A133 908

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AD-A133 668
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AD-A133 907

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AD-A131 785

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AD-A133 463

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AD-A131 682

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Visual Evoked Response Variability.
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Graphite Intercalation Compound,
AD-A133 244
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Intercalated Compounds: Evidence
from AsF5-Graphite,
AD-A133 293

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Mechanisms of Exciting Pressure
Oscillations in Ramjet Engines.
AD-A133 977

SIERRA GEOPHYSICS INC REDMOND WA

Estimation of the Yield of Recent Presumed
Explosions at Shagan River.   (U)

DESCRIPTIVE NOTE: Semi-annual rept. Dec 82-May 83,
   JUL 83   60P   Hadley,David M. ;
REPT. NO.  SGI-R-83-094
CONTRACT: F49620-83-C-0046, ARPA Order-4692
PROJ: 4692
MONITOR: AFOSR  TR-83-0730

SECRET REPORT

DECL-  OADR
Distribution limited to U.S. Gov't. agencies only;
Test and Evaluation; 16 Aug 83. Other requests for
THIS DOCUMENT MUST BE REFERRED TO Air Force Office of
Scientific Research, Attn: XOTD, Building 410,
Bolling AFB, DC 20332.

DESCRIPTORS: *Primary waves(Seismic waves),
*Seismic data, *Nuclear explosion testing,
Yield(Nuclear explosions), Data bases, Paths,
Attenuation, Cratering, Estimates, Bias,
Operators(Mathematics), Seismographs,
Simulation, Far field, Containment(General),
Delay, USSR, Nevada
IDENTIFIERS:  Body waves(Seismic waves),
Seismograms, Shagan River test site, Nevada
test site   (U)

SIERRA GEOPHYSICS INC REDMOND WA

The Effects of p P on Relative Yield
Estimation.   (U)

DESCRIPTIVE NOTE: Final technical rept. for period ending
31 Oct 82.
   MAR 83   58P   Lundquist,G. M. ;Mellman,
G. R.;Tucker,W. C.;Kaufman,S. K. ;
REPT. NO.  SGI-R-83-082
CONTRACT: F49620-81-C-0025, ARPA Order-3291
PROJ: 3291
TASK: 40
MONITOR: AFOSR  TR-83-0728

SECRET REPORT

DECL-  OADR
Distribution limited to U.S. Gov't. agencies only;
Test and Evaluation; 16 Aug 83. Other requests for
this document must be referred to Air Force Office of
Scientific Research, Attn: XOTD, Building 410,
Bolling AFB, DC 20332.
ABSTRACT:   The initial application of Relative
Waveform Inversion (RWI) to a data set of 22
NTS underground explosions is presented. Results
of this study indicate that RWI estimates of
effective pP time and amplitude show good agreement
with observed ground zero times. Some non-linearity
is indicated in both pP times and amplitudes.
Relative yield estimates derived using RWI prove
more accurate as yield estimators for this data set
than do standard m sub b estimates. An initial
discussion and determination of station-dependent
depth correction (to m sub b) curves for Shagan
River events is also developed. Analysis of these
curves indicates that m sub b errors of as much as
0.25 m sub b units may occur if depth effects are
ignored. (Author)   (U)
DESCRIPTORS: *Seismic data, *Primary waves(Seismic
waves), Wave propagation, Depth, Amplitude,
Delay, Waveforms, Inversion, Estimates,
Yield(Nuclear explosions), Ground motion,
Nuclear explosion simulation, Nuclear explosion
testing, Underground explosions, Nevada, USSR,
Seismic signatures
IDENTIFIERS:  RWI(Relative Waveform Inversion),
Body waves(Seismology), Seismic magnitude,
Nevada test site, Yucca flats, Pahute Mesa,
Shagan River, Kazakh, PE62714E.   (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-B075 934L   17/7   17/8   20/6

CHARLES STARK DRAPER LAB INC CAMBRIDGE MA

Technology Assessment of Passive Optical Gyros. Part 1. Overview of Concepts, Problems, and Approaches.   (U)

DESCRIPTIVE NOTE: Interim rept. 1 Sep 81-31 Aug 82,
  SEP 82   42P   Coccoli,J. David ;
REPT. NO. CSDL-C-5559
CONTRACT: F49620-79-C-0001
PROJ: 2305
TASK: B2
MONITOR: AFOSR TR-83-0695

UNCLASSIFIED REPORT

Distribution limited to U.S. Gov't. agencies only; Test and Evaluation; 11 Aug 83. Other requests for this document must be referred to Air Force Office of Scientific Research, Dept. of the Air Force, Bolling AFB, DC 20332.

ABSTRACT:   The report contains a synoptic overview cf: (1) instrument concepts, (2) organizations engaged in research and development and/or analysis of passive optical gyros, (3) bias and noise mechanisms, (4) bases for performance improvement, (5) preliminary estimates of future production costs, and (6) reliability factors for optical-fiber instruments. (Author)   (U)

DESCRIPTORS: *Gyroscopes, *Optical instruments, Fiber optics, Bias, Noise, Cost estimates, Performance(Engineering), Birefringence, Optical Production, Reliability, Tables(Data), State of the art, properties, Passive systems, Interferometers, Lasers, Resonators   (U)

IDENTIFIERS: Optical gyros, WUAFOSR2305B2, PE61102F   (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-B075 942L   8/4   11/6

HERNDON SCIENCE AND SOFTWARE INC SAN DIEGO CA

Technological Applications of Earth Core Research.   (U)

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Jan 82-1 Jan 83.
  FEB 83   10P   Herndon,J. Marvin ;
REPT. NO. HSSI-82-0002
CONTRACT: F49620-82-C-0024
MONITOR: AFOSR TR-83-0714

UNCLASSIFIED REPORT

Distribution limited to U.S. Gov't. agencies only; Proprietary Info.; Test and Evaluation; 12 Aug 83. Other requests for this document must be referred to Air Force Office of Scientific Research. Attn: XOTD, Building 410, Bolling AFB, Washington, DC 20332.

ABSTRACT:   The research is intended to address the question of what elements might be expected to form silicides in the core of the Earth and is aimed at determining and demonstrating the technological feasibility of new concepts originating from the research. Specifically, the research objectives are the following: (1) Prepare a complete bibliography on silicide technology, including the physical and chemical properties; (2) Conduct experiments to determine what elements form silicides. Determine the effects of phosphorous and copper on nickel silicides; (3) Conduct experiments on Earth core type materials to provide new materials and processes.   (U)

DESCRIPTORS: *Silicides, Earth core, Nickel alloys, Copper, Phosphorus, Alkaline earth compounds   (U)

IDENTIFIERS: WUAFOSR2309A1, PE61102F   (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 227    20/11    12/1

CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF MECHANICAL
ENGINEERING

On the Implications for LEFM (Linear Elastic    (U)
Fracture Mechanics) of the Three-Dimensional
Aspects in Some Crack/Surface Intersection
Problems.

DESCRIPTIVE NOTE:    Final rept. 1 Jun 79-30 Nov 82.
    JUN 83    65P    Burton,W. S. ;Sinclair,G.
B. ;Solecki,J. B. ;Swedlow,J. L. ;
REPT. NO.    SM-83-8
CONTRACT:    AFOSR-79-0078
PROJ:    2307
TASK:    B2
MONITOR:    AFOSR   TR-83-0863

UNCLASSIFIED REPORT

ABSTRACT:    Several elastic configurations
containing cracks under transverse tension which
intersect a free surface are investigated. In order
to ensure reliable results two independent numerical
methods are employed on a comparison problem, each
method being tuned to handle the special features
involved. The comparison provides confidence in
other results which focus on the key quantity in
linear elastic fracture mechanics, the energy release
rate. These findings may be summarized as follows:
that the decays in the energy release rate; found as
the free surface is approached in the various
problems treated are probably not significant from a
fracture toughness testing point of view and not of
major consequence in cyclic life calculations,
although there are some indications that this may not
be the case if near-surface residual stress fields
are present; and that these variations in energy
release rate can be compensated for by relatively
minor perturbations in crack-front profiles.    (U)
DESCRIPTORS:    *Fracture(Mechanics),
*Cracking(Fracturing), *Elastic properties,
*Linearity, Three dimensional, Crack propagation,
Integral equations, Finite element analysis,
Surfaces, Stress strain relations, Energy
levels    (U)
IDENTIFIERS:    LEFM(Linear Elastic Fracture    (U)
Mechanics), WUAFOSR2307B2, PE61102F

PAGE    3    AD-A134 227 •    UNCLASSIFIED    EVJ43D

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 473    9/5    9/1

CALIFORNIA UNIV BERKELEY

Design and Performance of Coplanar Waveguide    (U)
Bandpass Filters.

    JUL    83    10P    Williams,Dylan F. ;Schwarz,
S. E. ;
CONTRACT:    DAAG29-82-K-0166, F49620-79-C-0178
MONITOR:    ARO,AFOSR   19300.1-EL,TR-83-1035

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:    Pub. in IEEE Transactions on
Microwave Theory and Techniques, vMTT-31 n7 p558-
566 Jul 83.
Reprint: Design and Performance of Coplanar
Waveguide Bandpass Filters.

DESCRIPTORS:    *Bandpass filters, *Slots,
*Admittance. *Strip transmission lines,
*Waveguides, Equivalent circuits. Insertion loss,
Resonators. Reprints
IDENTIFIERS:    Microstrip waveguides, Admittance
inverters, Slotline waveguides, CPW(Coplanar
Waveguides), Coplanar slotlines, Coplanar
striplines. Coplanar waveguides

AD-A134 473    UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A134 130     3/2

LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND ASTRONOMY

The Precataclysmic Nucleus of Abell 41.     (U)

   AUG 83     7P     Grauer,Albert D. ; Bond,
Howard E. ;
REPT. NO. CONTRIB-172
CONTRACT: AFOSR-82-0192
PROJ: 2301
TASK: A2
MONITOR: AFOSR TR-83-0799

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Astrophysical Jnl,
   v271 p259-263, 1 Aug 83.
   Reprint: The Precataclysmic Nucleus of Abell 41.

DESCRIPTORS: *Binary stars, *Dwarf stars, Nebulae,
   Variable stars, Reprints     (U)
IDENTIFIERS: Abell 41 star     (U)

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DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A134 226     9/2     19/1

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT OF ENGINEERING SCIENCE AND MECHANICS

A Computer Study of Detonation Waves in Dispersed Powdered High Explosives.     (U)

DESCRIPTIVE NOTE: Final rept. 30 Jun 81-29 Jun 82,
   APR 83     17P     Frair,Karen L. ;
CONTRACT: AFOSR-81-0230
PROJ: 2308
TASK: D9
MONITOR: AFOSR TR-83-0874

UNCLASSIFIED REPORT

ABSTRACT:     Three established computer codes that
are used in the calculation of equilibrium
composition of combustion products are reviewed and
recommendations made cocerning their utilization in
detonation problems with dispered explosives.     (U)
(Author)
DESCRIPTORS: *Computer programs, *Computer aided
diagnosis, *Detonation waves, Chemical equilibrium,
Combustion products, High explosives,
Thermodynamic properties, Data acquisition, Input
output processing, Dispersions, Variables,
Pressure, Velocity, Flow, Predictions     (U)
IDENTIFIERS: EQUIL computer program, TIGER
computer program, Gordon and McBride computer
program, WUAFOSR2308D9, PE61102F     (U)

AD-A134 110     5/9     9/2     12/1

MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

Combining Testing with Formal Specifications:
A Case Study,                                    (U)

    MAY 83      9P      McMullin,Paul R. ;Gannon,
John D. ;
CONTRACT: F49620-80-C-0001
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-83-0779

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Software Engineering, vSE-9 n3 p328-335 May 83.
Reprint: Combining Testing with Formal
Specifications: A Case Study.

DESCRIPTORS: *Test methods, *Specifications,
*Computer programs, High level languages, Computer
programming, Algebraic functions, Methodology.
Computer applications
IDENTIFIERS: *CAT(Computer Aided Testing),
Testing, Data types, PE61102F,
WUAFOSR2304A2

5    AD-A134 110

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AD-A134 113    21/2    21/5

PURDUE UNIV LAFAYETTE IN COMBUSTION LAB

Flame Efficiency, Stabilization and
Performance in Prevaporizing/Premixing
Combustors.                                    (U)

DESCRIPTIVE NOTE: Final rept. 1 Dec 77-30 Sep 81,
    OCT 81    12P    Mellor,A. M. ;Proctor,C.
L. ;Nein,A. G. ;
REPT. NO. PURDU-CL-81-04
CONTRACT: AFOSR-77-3446
PROJ: 2308
TASK: A2
MONITOR: AFOSR TR-83-0741

UNCLASSIFIED REPORT

ABSTRACT:    This program was designed specifically
to address problems of combustion efficiency and
flame stabilization (blowoff and flashback) in
simplified combustors representative of ramjets (dump
combustors) and advanced turbojets (prevaporizing/
premixing and catalytic). Numerical, experimental
and semi-empirical techniques were used to examine a
simplified axisymmetric burner configuration
possessing the fundamental characteristics found in
real prevaporizing/premixing combustion systems.
Numerical analysis of the non-reacting flow field
of the prevaporizing/premixing combustor
configuration was performed using an elliptic finite-
difference computer code utilizing the k - e
turbulence model. Calculations were performed for a
variety of geometries and inlet flow conditions to
the combustor. Gas samples were extracted from
within the prevaporizing/premixing combustor for the
two flames examined, propane and Jet-A, and
analyzed for gaseous components. Temperature and
combustion efficiency calculations were made using
this information. Examination of the numerical and
experimental information revealed the invariant
behavior of the fundamental flow field with respect
to operating conditions. The type of combustion
single or two-phase fuel input into the combustor did
not significantly alter the flow field, but it did
change the relative intensities of combustion within
established combustion zones.                   (U)

DESCRIPTORS: *Combustors, *Flames, *Combustion,
Flow fields, Mathematical models, Vaporization,    (U)
IDENTIFIERS: Prevaporizing, Premixing,             (U)
    AD-A134 113

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A134 109     12/1     9/2     12/2

ARIZONA STATE UNIV TEMPE GROUP FOR COMPUTER STUDIES OF
STRATEGIES

On Some Issues Concerning Optimization and                (U)
Decision Trees.

DESCRIPTIVE NOTE: Interim rept.
     83     18P     Findler,Nicholas V. ;
Belofsky,Michael S. ;Bickmore,Timothy W. ;
REPT. NO. GCSS-TR-14, TR-83-003
CONTRACT: AFOSR-82-0340
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-83-0780

UNCLASSIFIED REPORT

ABSTRACT:    The authors describe the context and the
constituent modules of a large-scale programming
system, the Quasi-Optimizer. Its objectives are
(a) to observe and measure adversaries' behavior in a
competitive environment, to infer their strategies
and to construct a computer model, a descriptive
theory of each; (b) to identify strategy components,
evaluate their effectiveness and to select the most
satisfactory ones from a set of descriptive theories;
(c) to combine these components in a quasi-optimum
strategy that represents a normative theory in the
statistical sense. Also discussed are certain
properties of decision trees which are the primary
representational structures of strategies in the
computer. The verification of these properties,
such as identity, equivalence and similarity between
two decision subtrees, enable us to eliminate
redundancies in the decision trees.                      (U)
DESCRIPTORS: *Optimization, *Decision theory,
*Computers, *Mathematical models, Computer
architecture, Modular construction, Strategy,
Statistical decision theory,
Normalizing(Statistics), Learning, Planning,
Comparison, Systems analysis, Computerized
simulation, Computer programming                         (U)
IDENTIFIERS:  Decision trees, PE61102F,
WUAFOSR2304A2                                             (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A134 104     12/1

CONNECTICUT UNIV STORRS DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

An Algorithm for Detecting a Change in                    (U)
Stochastic Process.

DESCRIPTIVE NOTE: Technical rept.
     JUN 83     24P     Bansal,Rakesh Kumar ;
Papantoni-Kazakos,P. ;
REPT. NO. UCT/DEECS/TR-83-7
CONTRACT: AFOSR-78-3695
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0781

UNCLASSIFIED REPORT

ABSTRACT:    The problem of detecting a change from
one given stationary and ergodic stochastic process,
to another given such process is considered. It is
assumed that both the stochastic processes are
processes with memory, and that they are mutually
independent. A sequential test is proposed and
analyzed. It is proved that the proposed test is
asymptotically optimal, in a mathematically precise
sense. The test utilizes a reflecting barrier at
zero, and positive threshold for deciding the
occurrence of the change. (Author)                       (U)
DESCRIPTORS: *Algorithms, *Stochastic processes,
Ergodic processes, Variables, Stationary,
Sequences(Mathematics), Asymptotic normality,
Optimization                                             (U)
IDENTIFIERS: WUAFORS2304A5, PL61102F                     (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 101    14/5    17/9    20/6

MOORE SCHOOL OF ELECTRICAL ENGINEERING PHILADELPHIA PA
ELECTRO-OPTICS AND MICROWAVE-OPTICS LAB

High Resolution 3-D Tomographic Imaging by
Wavelength and Polarization Diversity.    (U)

DESCRIPTIVE NOTE: Annual rept. 30 Jun 82-29 Jun 83,
    JUL 83    144P    Farhat,N. H ;
REPT. NO.    EO/MO-6
CONTRACT: AFOSR-81-0240
PROJ: 2305
TASK: B1
MONITOR: AFOSR TR-83-0797

UNCLASSIFIED REPORT

ABSTRACT:    Research in high resolution microwave
imaging has to date concentrated broadly on the study
and development of efficient and cost-effective data
acquisition and image reconstruction methods for use
in lambda and polarization diversity 3-D
tomographic imaging. The techniques developed
combine angular, spectral, and polarization diversity
measurements with a unique targetr derived reference
technique to produce images of the scattering centers
on complex-shaped bodies with unprecedented
resolution and quality that exceed by far anything
reported to this date. Analytical studies of
information content, speckle suppression and
resolution show however that image quality can
further be enhanced and made to approach and even
exceed the resolution of optical systems when the
imaging or remote objects specially through the
earth's atmosphere is desired.    (U)
DESCRIPTORS: *Image processing, *Tomography,
*Holography, *Radar, *Microwaves, High
resolution, Frequency, Polarization, Spectrum
analysis, Scattering, Measurement, Specular
reflection, Suppression, Radar images, Display
systems, Three dimensional, Conical bodies,
Circular, Numerical analysis, Monochromatic light,
Noise reduction, Fourier transformation, Vector
analysis, Apertures, Thinness    (U)
IDENTIFIERS: PE61102F, WUAFOSR2305B1    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 095    20/12    20/5    9/1

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Laser Photodeposition and Photoetching
Study.    (U)

DESCRIPTIVE NOTE: Progress rept. 1 Jan-31 Mar 83,
    MAR 83    29P    Ehrlich,D. H. ;
CONTRACT: F49620-80-C-0002
PROJ: 2305
TASK: C1
MONITOR: AFOSR TR-83-0849

UNCLASSIFIED REPORT

ABSTRACT:    Work during this quarter has developed a
new technique for direct-write etching of Al and
Al:Si:Cu alloys, and has applied this new
process to correction of bridging faults in VLSI
signal-processing circuits. Additional work has
expanded upon two excimer-laser resist processes to
develop fast deep-UV lithographic procedures based
on these powerful UV sources. A final series of
experiments has extended pulsed UV-laser reactions
to area photodeposition of Al2O3 films.    (U)
DESCRIPTORS: *Aluminum alloys, *Etching, *Lasers,
*Integrated circuits, Silicon alloys Copper
alloys, Ultraviolet radiation, Pulsed lasers,
Photolithography, Films, Deposition    (U)
IDENTIFIERS: PE61102F, WUAFOSR2305C1    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 093    7/4

WISCONSIN UNIV-MADISON DEPT OF PHYSICS

Collisional Excitation and Radiation of Atoms and Molecules.    (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Jul 78-30 Jun 83,
   AUG 83,    5f    Lin,Chun C. ;
CONTRACT: AFOSR-78-3649
PROJ: 2301
TASK: A4
MONITOR: AFOSR TR-83-0802

UNCLASSIFIED REPORT

ABSTRACT:    The general objectives of this research project are to study collisional excitation of atoms and molecules and the radiation emitted by these excited atoms and molecules. Our major efforts include electron excitation of the sodium and xenon atoms, excitation of electronic states of nitrogen molecules, formation of excited nitrogen atoms by electron-impact dissociation of nitrogen molecules. Measurement of electron excitation cross sections of metastable levels of neon atoms, excitation of atoms by H+, HO, H- impact.    (U)
DESCRIPTORS: *Atomic energy levels, *Molecular energy levels, *Electronic states, *Collisions Excitation, Electron energy, Radiation, Nitrogen, Xenon, Neon, Metastable state, Radiation, Cross sections, Dissociation    (U)
IDENTIFIERS: PE61102F, WUAFOSR2301A4    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 094    20/12    7/4

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES

Studies of the Electronic Properties of Two-Dimensionally Confined Carriers in MIS (Metal-Insulator-Semiconductor) Inversion/Accumulation Layers, Heterojunctions and Quantum Wells.    (U)

DESCRIPTIVE NOTE: Final rept. 1 Dec 77-31 Mar 83,
   MAY 83    49P    Madhukar,A. ;
CONTRACT: AFOSR-78-3530
PROJ: 2306
TASK: B1
MONITOR: AFOSR TR-83-0767

UNCLASSIFIED REPORT

ABSTRACT:    This report states the results of several investigations of the one and many electron transport, magneto-transport, optical and magneto-optical properties of quasi two-dimensionally confined charge carriers realized in metal-insulator-semiconductor (MIS) inversion or accumulation layers, heterojunctions, and multiple, isolated or coupled, quantum well structures involving III-V compound semiconductors and their alloys.    (U)
DESCRIPTORS: *Semiconductors, *Electron transport, Group III compounds, Group V compounds, Heterojunctions, Magnetooptics, Optical properties, Layers, Quantum chemistry, Charge carriers, Two dimensional    (U)
IDENTIFIERS: MIS(Metal Insulator Semiconductor), PE61102F, WUAFOSR2306B1    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A134 059    11/9    11/4    20/11

TEXAS A AND M UNIV COLLEGE STATION MECHANICS AND MATERIALS RESEARCH CENTER

Research on Composite Materials for Structural Design.    (U)

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 82.
    APR 83    211P    Allen,D. ;Bradley,W. ;
    Haisler,W. ;Ham,J. ;Harbert,B. ;
REPT. NO.  MM-4665-83-4
CONTRACT:  F49620-82-C-0057
PROJ: 2307
TASK: B2
MONITOR:  AFOSR  TR-83-0861

UNCLASSIFIED REPORT

ABSTRACT:    Summarized are research activities related to advanced fiber reinforced plastics in the areas of fracture, delamination, distributed damage, residual stresses, moisture effects, and toughening mechanisms in elastic and viscoelastic materials. Also included are nine papers and abstracts of three M.S. Theses describing recently completed work in these areas.    (U)

DESCRIPTORS:  *Reinforced plastics, *Composite materials, *Structural mechanics, Fracture(Mechanics), Laminates, Polymers, Adhesives, Residual stress, Viscoelasticity, Damage assessment, Reports    (U)
IDENTIFIERS: PE61102F, WUAFOSR2307B2    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A134 088    6/20    6/1

NEW YORK ACADEMY OF SCIENCES NY

Cellular Systems for Toxicity Testing.    (U)

DESCRIPTIVE NOTE: Final rept. 1 Sep 82-31 Aug 83.
    JUN 83    497P    Williams,Gary M. ;Dunkel.
Virginia C ;Ray,V. A. ;
CONTRACT: AFOSR-82-0288
PROJ: 2312
TASK: K1
MONITOR:  AFOSR  TR-83-0828

UNCLASSIFIED REPORT

Availability: New York Academy of Sciences, New York, NY. HC $95.00 (No copies furnished by DTIC/NTIS).

ABSTRACT:    Contents: Metabolism and End Points of In Vitro Systems, Cytotoxicity, DNA Damage. Chromosome Effects, Mutagenicity Systems, Mammalian Mutagenesis, Transformation Systems, Effects of Tumor Promoters, Mechanistic Significance and Relevance of Short-Term Tests, Application of Short-Term Tests to Chemical Safety Evaluation, and Poster Papers.    (U)

DESCRIPTORS:  *Toxicity, *Cytology, *Cells(Biology), Test methods, Metabolism, In vitro analysis, Deoxyribonucleic acids, Damage, Chromosomes, Mutations, Mammals, Safety    (U)
IDENTIFIERS: Cytotoxicity, PE61102F, WUAFOSR2312K1

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 054    11/6    14/2    20/1

PURDUE UNIV LAFAYETTE IN

Grain structure Identification by UltraSound
Frequency Averaging and Deconvolution.                    (U)

DESCRIPTIVE NOTE:  Final rept. 1 Jun 81-31 Aug 82,
    JUL 83    40P    Furgason,E. S. ;
CONTRACT: AFOSR-81-0177
PROJ: 2306
TASK: A1
MONITOR: AFOSR  TR-83-0744

UNCLASSIFIED REPORT

ABSTRACT:    The objective of this research program
was to develop a technique to nondestructively
measure average grain size as a function of position
and to also provide some measure of the size
distribution of the scatterers. To nondestructively
evaluate the microstructure, the material was probed
using broad-band ultrasound. The resulting
backscattered ultrasound echoes were then processed
to obtain the required microstructure parameters by
applying techniques adapted from our previous work on
Flaw Enhancement in large grain materials.
Previous work on nondestructive microstructure
evaluation has centered on obtaining a single
parameter related to the average grain size in a
relatively large volume of material. In contrast,
this research effort was directed toward evaluating
the local microstructure of the material as function
of position. This does not imply a point-by-point
mapping of grain size, but rather the evaluation of
grain statistics within small volumes of the bulk
material.                                                  (U)
DESCRIPTORS: *Microstructure, *Nondestructive
testing, *Ultrasonics, *Grain size, Measurement,
Backscattering, Echoes, Structural properties,
Broadband, Grain structures(Metallurgy),
Parametric analysis, Computations, Bulk
materials
IDENTIFIERS:  Lattice spectrum, WUAFOSR2306A1,
PE61102F                                                   (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A134 034    11/6    20/11    5/2

RHODE ISLAND UNIV KINGSTON

Gordon Conference on Physical Metallurgy
(1983), 20-24 June 1983, Holderness School,
New Hampshire.                                            (U)

DESCRIPTIVE NOTE:  Final rept. 1 May-30 Sep 83.
    JUN 83    16P    Paton,Neil E. ;
CONTRACT: AFOSR-83-0119
PROJ: 2306
TASK: A1
MONITOR: AFOSR  TR-83-0842

UNCLASSIFIED REPORT

ABSTRACT:    The topic chosen for the 1983 Gordon
Conference on Physical Metallurgy was High
Temperature Deformation with the emphasis of the
presentations being on large strain deformation and
microstructure effects. Over one hundred scientists
attended the conference, with 21 of them being from
outside the United States, mostly from Europe.
The quality of the presentations was uniformly
excellent, prompting stimulating discussion periods
with an extensive exchange of ideas for new
approaches and research opportunities.                    (U)
DESCRIPTORS: *Physical metallurgy, *Symposia,
Metals, High temperature, Microstructure,
Strain(Mechanics), Deformation, Reports,
Conferencing(Communications)                              (U)
IDENTIFIERS: PE61102F, WUAFOSR2306A1                      (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A134 001    8/11    12/1

CALIFORNIA INST OF TECH PASADENA SEISMOLOGICAL LAB

Synthetics and Theoretical Seismology.                    (U)

DESCRIPTIVE NOTE:    JUL 83    11P    Harkrider,David G. ;
REPT. NO.  CONTRIB-3892
CONTRACT:  F49620-81-C-0008
PROJ:  3291
TASK:  40
MONITOR:  AFOSR  TR-83-0805

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Pub. in Reviews of Geophysics and
    Space Physics, v21 n6 p1299-1308 Jul 83.
    Reprint: Synthetics and Theoretical Seismology.
DESCRIPTORS:  *Seismic waves, *Seismic data,
    Numerical integration, Near field, Finite element
    analysis, Regions, Global, Transitions,
    Inversion, Sources, Kinematics, Analogs,
    Heterogeneity, Oscillation,
    Coupling(Interaction), Seismology, Theory.
    Reprints
IDENTIFIERS:  Synthesis(Seismology), Wave number          (U)
    integration, PE62714E, WUAFOSR329140                  (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A134 002    20/4    14/2    20/3

AMAF INDUSTRIES INC COLUMBIA MD

Magnetic Field Coupled Velocimeters.                      (U)

DESCRIPTIVE NOTE: Final rept. 1 Dec 81-30 Nov 82.
    83    63P    Spight,Carl ;
REPT. NO.  8308-X4400-201
CONTRACT:  F49620-82-C-0017
PROJ:  2308
TASK:  A3
MONITOR:  AFOSR  TR-83-0856

UNCLASSIFIED REPORT

Availability: Document partially illegible.
ABSTRACT:    The velocimeter R&D program entered a
    'bench-top' scale experimental demonstration phase
    with the construction of a first prototype
    velocimeter drive-pickup coil array, a propane
    combustor test stand, and Z-80 based data
    acquisition/processing system. A computer code was
    written and successfully tested which modeled the
    response of the velocimeter array to flow field
    structures that could be realized on the test stand.
    Conventional diagnostics have been used to
    characterize the flow environment produced on the
    test stand. Preliminary testing of the velocimeter
    was begun at the end of the program year. Problems
    with signal detection and analysis were tentatively
    identified and possible solutions were under design.  (U)
    (Author)
DESCRIPTORS:  *Velocimeters, *Flow fields, Magnetic
    fields, Coupling(Interaction), Boundary layer
    flow, Computer programming, Test stands, Eddy
    currents                                              (U)
IDENTIFIERS:  PE61102F, WUAFOSR2308A3                     (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 997    11/6

GEORGIA INST OF TECH ATLANTA FRACTURE AND FATIGUE RESEARCH LAB

The Effect of Microstructure on the Properties of High Strength Aluminum Alloys.    (U)

DESCRIPTIVE NOTE: Final rept. 1 Jan 78-1 Jan 83,
JAN 83    10P    Starke,Edgar A. , Jr;
CONTRACT: AFOSR-78-3471
PROJ: 2306
TASK: A1
MONITOR: AFOSR TR-83-0845

UNCLASSIFIED REPORT

ABSTRACT:    This program was initiated in January, 1978, and was concerned with the effect of microstructure on the properties of two different classes of aluminum alloys of current interest to the Air Force: (1) high strength Al-Zn-Mg-X alloys and (2) low density, high modulus Al-Li-X alloys. The program terminated on December 31, 1982.    (U)
DESCRIPTORS: *Aluminum alloys, *Microstructure, *High strength alloys, Fatigue(Mechanics), Cracking(Fracturing), Aging(Materials), Shear strength, Heat treatment    (U)
IDENTIFIERS: Aluminum alloy 2020, Peak aged, WUAFOSR2306A1, PE61102F    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 977    21/5

CALIFORNIA INST OF TECH PASADENA

Mechanisms of Exciting Pressure Oscillations in Ramjet Engines.    (U)

DESCRIPTIVE NOTE: Interim rept. 20 Aug 80-19 Aug 81,
OCT 82    10P    Culick,F. E. C. ;Marble, F. E. ;Zukoski,E. E. ;
CONTRACT: AFOSR-80-0265
PROJ: 2308
TASK: A2
MONITOR: AFOSR TR-83-0875

UNCLASSIFIED REPORT

ABSTRACT:    This report covers the first year of an experimental and analytical program concerned with problems of pressure oscillations in ramjet engines. Initial tests have been performed showing that the blowdown facility operates as planned; modifications for operation at higher pressure have been started. An analysis of the response of a normal shock wave to pressure oscillations has been completed and will be used as the upstream boundary condition in calculations of the acoustical field. Construction of a general framework for analyzing the instabilities in engines has been started, including modeling of the steady flow field. Special attention is being directed to unsteady shear layers and combustion in a vortex as a mechanism for exciting pressure oscillations. Utilizing the physical model derived from the transient burning of a flame in a vortex field, it has been possible to correlate screech data for a wide variety of fuels. (Author)    (U)
DESCRIPTORS: *Ramjet engines, Oscillation, Pressure, Combustion stability, Shock waves, Flow fields, Steady flow    (U)
IDENTIFIERS: Dump combustors, PE61102F, WUAFOSR2308A2    (U)

AD-A133 973    6/16

OREGON HEALTH SCIENCES UNIV PORTLAND

The Neuronal Basis of Learning.                                    (U)

DESCRIPTIVE NOTE: Final rept. 1 Jan 82-9 Jan 83.
  JUN 83    10P    Mpitsos,George J. ;
CONTRACT: AFOSR-82-0043
PROJ: 2312
TASK: A1
MONITOR: AFOSR TR-83-0853

UNCLASSIFIED REPORT

ABSTRACT:    Studies have begun on the conditioning
of identified neurons in the leech Hirudo and on
the sea hare Aplysia, and studies have begun on the
sea lung Pluerobranchaea on an aspect of the
proposed research common to the conditioning of
identified neurons system, i.e., those that produce
several behaviors by means of the same constituent
neurons. In the studies on Hirudo, evidence has
been obtained for conditioning in identified neurons
that receive inputs from equally identifiable sensory
neurons that convey to the central nervous system the
conditioned and unconditioned stimuli used in
training. At least in one circuit, the neuron that
produces the reinforcement has been identified.
These changes, however, are short-term, lasting
usually no longer than a few seconds to several
minutes after training. In further experiments,
already begun, the neuroeffective substances related
to stress that may convert the short-term changes
into long-lasting ones will be examined. Similar
experiments have been done in Aplysia, but these
are presently too few in number (20 as opposed to 40
on Hirudo) from which to make definite
statements.                                                        (U)

DESCRIPTORS: *Learning, *Neurophysiology, *Nerve
cells, Senses(Physiology), Aplysia, Stimuli,
Response(Biology), Interactions                                    (U)
IDENTIFIERS: Leeches, PE61102F,
WUAFOSR2312A1                                                       (U)

AD-A133 973            UNCLASSIFIED

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AD-A133 970    12/1    20/4    1/3

MASSACHUSETTS INST OF TECH CAMBRIDGE COMPUTATIONAL FLUID
DYNAMICS LAB

Computational Methods for Complex
Flowfields.                                                        (U)

DESCRIPTIVE NOTE: Annual rept. 1 Jun 82-31 May 83,
  JUL 83    64P    Murman,Earll M. ;Baron,
Judson R. ;
CONTRACT: AFOSR-82-0136
PROJ: 2307
TASK: A1
MONITOR: AFOSR TR-83-0841

UNCLASSIFIED REPORT

ABSTRACT:    The overall objective of this research
is the development of solution algorithms for complex
flowfields using procedures that take account of,
recognize, and couple interacting subdomains. In
task I, non-adaptive embedded mesh solutions of the
Euler equations have been obtained for NACA 0012,
RAE 2822, and Korn 1 air foils. In Task II
adaptive embedded mesh solutions have been obtained
for one-dimensional flows with shock waves and a two-
dimensional scalar convection-diffusion
equation.                                                          (U)

DESCRIPTORS: *Numerical methods and procedures,
*Flow fields, *Computations, Airfoils,
Embedding, Differential equations, Shock waves,
Fluid dynamics, Algorithms, Solutions(General),
Mesh, Grids, Navier Stokes equations                              (U)
IDENTIFIERS: Euler equation, PE61102F, LPN-
MIT-OSP-92113                                                      (U)

PAGE    13    AD-A133 970    UNCLASSIFIED    EVJ43D

AD-A133 964   7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

Commensurate-Incommensurate and Melting Transitions in Bromine-Intercalated Single Crystal Kish Graphite,   (U)

NOV 82   8P   Erbil,A. ;Kortan,A. R. ; Birgeneau,R. J. ;Dresselhaus,M. S. ;
CONTRACT: F49620-83-C-0011, F49620-81-C-0006
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0757

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in MRS Symposium on Intercalated Graphite, p51 1983. Reprint: Commensurate-Incommensurate and Melting Transitions in Bromine-Intercalated Single Crystal Kish Graphite.   (U)

DESCRIPTORS: *Graphite, *Bromine compounds, *Molecular structure, *Thermal properties, Melting, Phase studies, Transitions, Single crystals, X ray scattering, Anisotropy, Reprints   (U)

IDENTIFIERS: GIC(Graphite Intercalated Compounds), Kish graphite, PE61102F, WUAFOSR2306C3   (U)

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AD-A133 969   12/1   11/6   20/11

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MECHANICAL ENGINEERING

Modelling Particle - Particle Interaction at the Micro Scale.   (U)

DESCRIPTIVE NOTE: Final rept. 1 Nov 77-30 Sep 81,
MAR 83   117P   Swedlow,J. L. ;
REPT. NO. SM83-2A
CONTRACT: AFOSR-78-3533
PROJ: 2307
TASK: B2
MONITOR: AFOSR TR-83-0868

UNCLASSIFIED REPORT

ABSTRACT:   IN high-strength alloys, microstructure can influence toughness in a manner not yet fully quantified. Computational mechanics offers a tool whereby the events leading to fracture may be simulated, but the success of such an enterprise depends heavily upon the quality of the model employed. This report outlines a sequence of events thought to precede ductile fracture and presents a finite element model designed to capture the main events. The model is considered to be an improvement over an earlier one, and data are presented to support this conclusion. Work of this type requires a fine degree of resolution which normally will entail very large, detailed finite element maps. Such map sizes could easily exceed the capacity of research computers, and a substructuring technique is essential to pursue research of this sort. Such a technique has been developed for use without modification to an existing code, i.e. it may be implemented on a standard finite element program directly. (Author)   (U)

DESCRIPTORS: *Mathematical models, *Finite element analysis, *High strength alloys, *Microstructure, Particles, Interactions, Toughness, Ductility, Computerized simulation, Loads(Forces), Matrix materials, Dispersing, Stress concentration, Plastic properties, Elastic properties, Titanium alloys, Aluminum, Vanadium, Stress strain relations   (U)

IDENTIFIERS: Particle interactions, Fracture, PE61102F, WUAFOSR2307B2   (U)

DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A133 958      20/1

TORONTO UNIV DOWNSVIEW (ONTARIO) INST FOR AEROSPACE
STUDIES

Experimental and Analytical Studies of
Shielding Concepts for Point Sources and                    (U)
Jet Noise.

DESCRIPTIVE NOTE: Interim rept.,
     MAY  83   189P      Wong,Raymond Lee Man ;
REPT. NO.  UTIAS-266
CONTRACT:  AFOSR-75-2808
PROJ:  2307
TASK:  A3
MONITOR:  AFOSR  TR-83-0838

                  UNCLASSIFIED REPORT

ABSTRACT:     This analytical and experimental study
explores concepts for jet noise shielding. Model
experiments centre on solid planar shields,
simulating engine-over-wing installations and 'sugar
scoop' shields. Tradeoff on effective shielding
length is set by interference 'edge noise' as the
shield trailing edge approaches the spreading jet.
Edge noise is minized by (1) hyperbolic cutouts
which trim off the portions of most intense
interference between the jet flow and the barrier and
(2) hybrid shields - a thermal refractive extension
(a flame); for (2) the tradeoff is combustion noise.
In general, shielding attenuation increases
steadily with frequency following low frequency
enhancement by edge noise. Although broadband
attenuation is typically only several decibels, the
reduction of the subjectively weighted perceived
noise levels is higher. In addition, calculated
ground contours of peak PN dB (perceived noise
level) show a substantial contraction due to
shielding: this reaches 66% for one of the 'sugar
scoop' shields for the 90 PN dB contour.              (U)
DESCRIPTORS:  *Jet engine noise, *Shielding.
Acoustics, Noise reduction, Planar structures,        (U)
Scoops, Barriers, Aircraft noise                      (U)
IDENTIFIERS:  PE61102F, WUAFOSR2307A3

AD-A133 958         UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A133 952      5/10

SRI INTERNATIONAL MENLO PARK CA

Spatiotemporal Characteristics of Visual            (U)
Localization.

DESCFIPTIVE NOTE:  Annual technical rept.  1 Jun 82-31
     May  83,
     JUL   83     15P      Burbeck,Christina A. ;
CONTRACT:  F49620-82-K-0024
PROJ:  2313
TASK:  A5
MONITOR:  AFOSR  TR-83-0832

                  UNCLASSIFIED REPORT

ABSTRACT:     A computer-based display system has been
designed and built enabling the investigation of the
processes underlying spatial localization. Among
the results obtained in the past year with the use of
this device are: (a) Eye movements play a
significant role in spatial localization that is not
limited to positioning the stimulus array optimally
on the retina. (b) Neither retinal image drift nor
abrupt movement of the retinal image is sufficient to
restore normal performance on a localization task
when the effects of eye movements on retinal image
position are eliminated.  (c) Preliminary data
indicate that localization is a very slow process,
much slower than form detection. In related work it
has been shown that for some simple forms (sine wave
gratings) the relative orientation of the stimuli
does not affect ability to detect small differences
in their sizes and conversely a difference in size
between two stimuli does not affect ability to detect
a small difference in their orientations. Further
it has been found that the detection of small
differences in size between two objects is masked
strongly by stimuli consisting of fine lines but not
by stimuli consisting of broader lines (high and low
spatial frequency gratings respectively). It has
also been found that eye movements are essential to
the discrimination of objects on the basis of hue
except in the yellow region of the spectrum.          (U)
DESCRIPTORS:  *Visual perception, Eye movements,
Discrimination, Orientation(Direction), Images,
Retina, Drift, Detection, Stimuli                    (U)
IDENTIFIERS:  PE61102F, WUAFOSR2313A5                 (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 946    12/1    5/10

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

Investigation of an Error Theory for Conjoint Measurement Methodology.    (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Mar 82-31 Mar 83,
  MAY 83  170P  Nygren,Thomas E. ;
CONTRACT: AFOSR-82-0175
PROJ: 2313
TASK: D9
MONITOR: AFOSR TR-83-0860

UNCLASSIFIED REPORT

ABSTRACT:    This report presents the results of an attempt to propose a basis for an error theory of conjoint measurement methodology. Conjoint measurement methodology offers a new and potentially useful approach for obtaining psychological scale values for components of multidimensional attributes. This report describes the mathematical foundations of this methodology as well as a means of evaluating the fit of an additive conjoint measurement model to a three factor design. For each of the critical axioms of conjoint measurement, proportions of errors that would be expected by chance for different conditions of simple independence are examined. In addition, a computer-based algorithm that can be used to perform specific kinds of conjoint analysis has been generalized and documented as a technique for assessing the fit of an additive model to a set of data. The program is called SWAT and its current state of development is described in this report. Finally, the appendices provide a step-by-step explanation of data deck arrangements for SWAT as well as some actual printouts from the program.
DESCRIPTORS: *Error analysis, Mathematical models, Methodology, Computer aided instruction, Algorithms, Psychology, Scale    (U)
IDENTIFIERS: *Conjoint measurement, SWAT computer programs, LPN-OSURF-763025/714404    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 947    11/6    20/11    1/3

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

Deformation and Fatigue of Aircraft Structural Alloys.    (U)

DESCRIPTIVE NOTE: Rept. no. 1 (Final), 1 Jan 80-31 Dec 82.
  JUL 83  106P  Wert,J. A. ;Chesnutt,J. C. ;Mitchell,M. R. ;
REPT. NO. SC5254.2FR
CONTRACT: F49620-80-C-0030
PROJ: 2306
TASK: A1
MONITOR: AFOSR TR-83-0745

UNCLASSIFIED REPORT

ABSTRACT:    This final report describes results obtained during the course of a two-part basic research program addressing problems of airframe structural materials. Both areas of investigation concentrated on deformation of alpha-Beta titanium alloys. In Part I, superplasticity of two-phase titanium alloys was investigated, with the goal of improving the superplastic forming capabilities through alloy modifications. Part II of this program concentrated on understanding the early stages of fatigue crack initiation and propagation in titanium alloys.    (U)
DESCRIPTORS: *Titanium alloys, *Plastic properties, *Fatigue(Mechanics), *Structural mechanics, Airframes, Aluminum alloys, Vanadium alloys, Strength(Mechanics), Crack propagation, Microstructure, Structural analysis    (U)
IDENTIFIERS: PE61102F, WUAFOSR2306A1    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 944    7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

Magnetic Heat Capacity of Stage 2 Graphite-
CoCl2,                                                    (U)

        83    7P    Shayegan,M. ;Salamanca-Riba.
L. ;Heremans,J. ;Dresselhaus,G. ;Issi,J-P.
;
CONTRACT: F49620-83-C-0011, F49620-81-C-0006
PROJ:  2306
TASK:  C3
MONITOR:  AFOSR  TR-83-0754

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in MRS Symposium on
  Intercalated Graphite, p213 1983.
  Reprint: Magnetic Heat Capacity of Stage 2
  Graphite-CoCl2.

DESCRIPTORS: *Graphite, *Cobalt compounds,
*Magnetic fields, *Thermal analysis, Chlorine,
Temperature, Magnetic properties, Measurement,
Reprints                                                (U)
IDENTIFIERS:  GIC(Graphite Intercalated
Compounds), Magnetic heat capacity, PE61102F,
WUAFOSR2306C3                                          (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 945    6/4    17/9

ENVIRONMENTAL RESEARCH INST OF MICHIGAN ANN ARBOR

Study on Extremizing Adaptive Systems and
Applications to Synthetic Aperture Radars.    (U)

DESCRIPTIVE NOTE:  Annual scientific rept. 10 Sep 82-9
  Sep 83,
  MAY  83    83    6P    Politis,Demetrios ;
CONTRACT: F49620-82-C-0097
PROJ:  2312
TASK:  A1
MONITOR:  AFOSR  TR-83-0852

UNCLASSIFIED REPORT

ABSTRACT:    Klopf's work on the functioning of the
neuron was studied and critically examined for
engineering application possibilities. Similarly,
Barto's work on the implementation of Klopf's
ideas in computer simulated nets/systems was studied
to determine if it could provide suitable models for
physical systems. The latest learning system
investigated by Barto, described as 'Learning
with an Adaptive Critic' was considered as the
most promising for engineering applications. A
functional engineering model of that system has been
developed and its dynamic behavior of this system is
currently being investigated in order to improve our
understanding of the system operation and potential
applications. In parallel with this study we are
looking for possible application of such learning
systems in synthetic aperture radars and data
exploitation. Several potential applications have
already been suggested. These suggestions will be
further explored and the most promising will be
proposed for full investigation and possible
implementation.                                        (U)
DESCRIPTORS: *Adaptive systems, Bionics, Nerve
cells, Computerized simulation, Learning,
Searching, Feedback, Synthetic aperture radar,
Neural nets, Sampling, Weighting functions,
Models                                                 (U)
IDENTIFIERS:  Learning with critic, PE61102F,
WUAFOSR2312A1                                           (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 935      20/11    11/9

PURDUE UNIV LAFAYETTE IN SCHOOL OF AERONAUTICS AND
ASTRONAUTICS

Initiation, Growth, and Coalescence of Small    (U)
Fatigue Cracks.

DESCRIPTIVE NOTE:  Annual scientific rept.  15 Jan 82-15
Jan 83,
    MAY  83     86P     Grandt,A. F. , Jr;
CONTRACT:  AFOSR-82-0041
PROJ:  2307
TASK:  B2
MONITOR:  AFOSR  TR-83-0867

UNCLASSIFIED REPORT

ABSTRACT:      This interim report summarizes the first
year's progress on a research effort directed at
studying the initiation, growth, and coalescence of
small fatigue cracks at notches. A fracture
mechanics based model is described to predict the
growth and coalescence of multiple cracks located at
notches. Stress intensity factors are presented for
interacting cracks located at holes. The predictive
model is compared with experimental results obtained
with multiply cracked specimens made from a
transparent polymer. Current efforts and future
goals are also briefly described. (Author)      (U)
DESCRIPTORS: *Crack propagation,
*Fatigue(Mechanics), *Fracture(Mechanics),
*Polymethyl methacrylate, Models,
Cracking(Fracturing), Coalescence, Notch
toughness, Stress concentration,
Fatigue(Mechanics), Mathematical prediction     (U)
IDENTIFIERS:  PE61102F, WUAFORS230782     (U)

13      AD-A133 935      UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 942      7/4      20/4

YALE UNIV NEW HAVEN CT DEPT OF CHEMICAL ENGINEERING

Collisional Energy Exchange in Polyatomic         (U)
Molecules.

DESCRIPTIVE NOTE:  Final technical rept. 1 Jan 80-31
Dec 82.
    AUG   83     15P     Ryali,S. B. ;Fenn,J. B.

CONTRACT:  F49620-80-C-0026
PROJ:  2303
TASK:  B1
MONITOR:  AFOSR  TR-83-0804

UNCLASSIFIED REPORT

ABSTRACT:     Fourier Transform Infrared
Spectrometry (FTIS) has been used to study
several kinds of gas-gas and gas-surface collision
processes brought about with and in supersonic free
jets in vacuo. Following are some key results: (1)
Terminal distributions of rotational energy in free
jets of CO and CO2 show a non-Boltzmann
distribution that can be characterized by a two-
temperature model and explained in terms of
competition between rotation-rotation and rotation-
translation transfers. (2) Spectra of CO2
molecules excited by collisions with N2 molecules
indicated similar two-temperature distributions,
possibly due to secondary collisions between excited
CO2 and N2. (3) The accommodations of
vibrational and rotational energy during collisions
between CO, CO2 and NO molecules and hot
platinum surfaces has been determined over a range of
surface temperatures. (4) Excess internal energies
have been determined in nascent CO and CO2
molecules formed respectively by catalytic oxidation
of C and CO on a platinum surface. An energy
balance indicates that about 1/3 of the available
reaction energy is absorbed by the surface, the
remainder going mostly into vibrational modes of
product molecules.                                   (U)
DESCRIPTORS: *Molecule molecule interactions,
*Energy transfer, *Jet flow, *Fourier
spectroscopy, *Infrared spectroscopy, Polyatomic
molecules, Fourier transformation, Molecular
rotation, Energy, Distribution, Gas surface
interactions, Collisions, Catalysis, Carbon       (U)
IDENTIFIERS: FTIS(Fourier Transform Infrared      (U)

AD-A133 942        UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 928    6/16    6/19

SAINT LOUIS UNIV MO SCHOOL OF MEDICINE

Experiments on Factors That Influence
Muscular Function in Man.    (U)

DESCRIPTIVE NOTE: Final rept. Jul 80-Sep 82,
    MAY 83    79P    Lind,A. R. ;Williams,C.
A. ;Hoffman,M. D. ;
CONTRACT: AFOSR-80-0221
PROJ: 2312
TASK: A1
MONITOR: AFOSR TR-83-0859

UNCLASSIFIED REPORT

ABSTRACT:    Research was concerned with muscular
function and fatigue. The systemic cardiovascular
responses are much the same when the contractions
result in muscular fatigue, at which time the mean
blood pressure is the same as it is in response to
sustained isometric contractions. All the available
evidence points to the same mechanisms being
involved, centering around the reflex of chemical
origin in active muscles. There appears, however,
to be considerable differences in the local control
of blood vessels when isometric contractions are
pursued to fatigue on a continuous or on an
intermittent basis. In the present experiments we
have shown that the constriction is neural in origin
and that metabolites which normally inhibit that
constriction are unable to migrate through the
interstitial space to larger arterioles not in the
direct vicinity of the contracting muscles. The
performance of very short bouts of rhythmic exercise
can result in dramatic reductions of isometric
endurance and, to some extent, isometric strength.
The functional consequences are obvious: jobs
calling for either isometric strength or endurance
can be seriously impaired by previous rhythmic
exercise. The causes are only partially disclosed
by our experiments.    (U)
DESCRIPTORS:    *Muscles, *Exercise(Physiology),
Heart rate, Physiological effects, Human body,
Blood circulation, Control, Fatigue(Physiology),
Blood pressure, Contraction, Functions,
Metabolites. Endurance(Physiology)    (U)
IDENTIFIERS: Isometrics. Bicycling.    (U)
WUAFOSR2312A1, PE61102F

AD-A133 928

PAGE    19    UNCLASSIFIED    EVJ43D

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 930    17/2

CALIFORNIA UNIV LOS ANGELES DEPT OF ELECTRICAL
ENGINEERING

Synchronous and Channel-Sense Asynchronous
Dynamic Group-Random-Access Schemes for
Multiple-Access Communications,    (U)

SEP    83    18P    Rubin,Izhak ;
CONTRACT: AFOSR-82-0304, NSF-ECS80-12568
PROJ: 2304
TASK: A6
MONITOR: AFOSR TR-83-0811

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Communications. vCOM-31 n9 p1063-1077 Sep 83.
Reprint: Synchronous and Channel-Sense
Asynchronous Dynamic Group-Random-Access Schemes
for Multiple-Access Communications.    (U)

DESCRIPTORS:    *Multiple access, *Communications
traffic, Channels, Throughput, Collisions,
Synchronism, Asynchronous systems, Reprints    (U)
IDENTIFIERS: Packet communications, Random access;    (U)
WUAFOSR2304A6, PE61102F

AD-A133 930    UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 927    12/1    9/1    9/2

RENSSELAER POLYTECHNIC INST TROY NY CENTER FOR INTEGRATED
ELECTRONICS

Fault Tolerant Signal Processing Using
Finite Fields and Error-Correcting Codes.    (U)

DESCRIPTIVE NOTE: Final rept.,
    JUN  83    98P    Redinbo,G. R. ;
CONTRACT: AFOSR-80-0153
PROJ: 2304
TASK: A6
MONITOR: AFOSR  TR-83-0839

UNCLASSIFIED REPORT

ABSTRACT:    Finite field arithmetic may be
efficiently applied for implementing signal
processing architectures. The fundamental
theoretical work in this area was done by Matiuk
and Gill. This report presents several new
approaches for incorporating error-correcting codes
with signal processing operations yielding fault
tolerant systems. Fault tolerant levels can be
distributed throughout the system's architecture.
Such architectures will become necessary when very
sophisticated and dense systems are implemented with
Very Large Scale Integration.    (U)
DESCRIPTORS: *Numerical methods and procedures,
*Signal processing, *Fault tolerant computing,
Polynomials, Error correction codes,
Transformations(Mathematics), Decomposition,
Algorithms
IDENTIFIERS: Finite fields. WUAFOSR2304A6,
PE61102F

AD-A133 927

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 926    6/5    6/1

YALE UNIV NEW HAVEN CONN SCHOOL OF MEDICINE

Studies of Organophosphate Effects on Retinal
Physiology, Cell Biology and
Biochemistry.    (U)

DESCRIPTIVE NOTE: Annual rept. 1 Apr 82-31 Mar 83,
    JUL  83    13P    Reid,Ted W. ;Stein,Peter
J. ;
CONTRACT: F49620-82-C-0050
PROJ: 2312
TASK: K1
MONITOR: AFOSR  TR-83-0833

UNCLASSIFIED REPORT

ABSTRACT:    The overall goal of this project is to
determine quantitatively and qualitatively the
influence of organophosphate (OP) compounds on
ocular tissues, especially the retina. Initial
efforts have been to develop tissue and organ culture
systems of retina and lens cells. These systems
have been based on our studies with a human retinal
tumor cell line (retinoblastoma-Y79) developed in
our laboratories. We have successfully isolated a
growth factor from the tumor cell line which is
required for the growth of Y79 cells. In serum-
free studies we have determined the growth
requirements for the retinoblastoma cells and have
shown that the growth factor, which is secreted by
the cells, must bind to the cell surface in order to
activate growth. Preliminary experiments have been
performed on the transport of H3-
diisopropylfluorophosphate (DFP) through the rabbit
cornea in order to determine its rate of penetration
through the cornea to the aqueous humor. Results
show that it takes approximately 20 minutes for the
DFP to appear in the aqueous humor and this process
seems to be independent of the concentration of the
OP. Thus we feel this is probably a bulk
transport phenomenon. To examine the effects of
OPs on retinal physiology, we have recorded
electroretinograms (ERGs) from isolated, superfused
retinae of the marine toad, Bufo marinus. The
data indicate that superfusion with DFP
differentially alters tha a and b wave components of
the ERG.    (U)
DESCRIPTORS: *Organophosphates, Retina,    (U)
Physiological effects, Cells(Biology),
    AD-A133 926

PAGE    20

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 923    12/1    9/2    9/1

TOLEDO UNIV OH DEPT OF ELECTRICAL ENGINEERING

Statistical Simulation of GaAs MESFETS.                                      (U)

DESCRIPTIVE NOTE: Final scientific rept. 1 Mar 82-31
Jul 83,    AUG   83    25P    Thorbjornsen,Arthur R. ;
REPT. NO.  UT-EE-83-21
CONTRACT:  AFOSR-82-0119
PROJ:  2306
TASK:  D9
MONITOR:  AFOSR  TR-83-0800

UNCLASSIFIED REPORT

ABSTRACT:   A method has been developed for the
statistical simulation of gallium arsenide metal
semiconductor field effect transistors. Simulated
device parameter distributions were compared with
measured parameter distributions using the
Kolmogorov-Smirnov test. By adjusting the
individual input parameter in a trial and error
process, an acceptable simulation was obtained for
the parameter distributions of five different
devices. The correlation coefficients between
device parameters produced in the simulation were
acceptable except for one parameter. A set of
equations was derived for computing the parameters of
the Curtice GaAs MESFET model in terms of six
standard measured device parameters. A comparison
of simulated and measured Curtice model parameters
for the five devices did not indicate an acceptable
match. (Author)                                      (U)

DESCRIPTORS:  *Mathematical models, *Computerized
simulation, *Field effect transistors, Metal oxide
semiconductors, Gallium arsenides, Parametric
devices, Monte Carlo method, Distribution,
Input, Equations, Computations.                      (U)
IDENTIFIERS: Kolmogorov Smirnov statistics.          (U)
WUAFOSR2306D9, PE61102F

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 918    20/4

DAYTON UNIV OH SCHOOL OF ENGINEERING

Nonlinear Oscillations of a Fluttering Panel
in a Transonic Airstream.                            (U)

DESCRIPTIVE NOTE: Final rept. 1 May 81-1 May 82,
APR  83   110P    Eastep,Franklin E. ;
REPT. NO.  UDR-TR-83-43
CONTRACT:  AFOSR-81-0134
PROJ:  2307
TASK:  D9
MONITOR:  AFOSR  TR-83-0858

UNCLASSIFIED REPORT

ABSTRACT:    A flutter analysis has been conducted on
a simply supported panel to demonstrate the
successful combining of the panel (Von Karman)
large deflection equations with a linear aerodynamic
(Piston) theory for determining the panel response.
The panel response was determined by coupling a
Galerkin modal representation with a numerical time
integration scheme. The time integration scheme was
also successfully used to obtain the linear
structural (small-deflection) response to a nonlinear
aerodynamic pressure. Because the representation of
the nonlinear panel response by a linear
superposition of linear mode shapes is very
questionable, the Von Karman large deflection
equations were replaced by a large deflection finite-
element representation. The nonlinear panel
response of the finite-element model was obtained
using Piston theory aerodynamics and it is
recommended that the finite-element response be
determined for a nonlinear aerodynamic pressure.    (U)

DESCRIPTORS:  *Aeroelasticity, *Flutter, *Panels,
*Transonic flow, *Aerodynamics, Oscillation,
Nonlinear systems, Deflection, Equations,
Theory, Structural response, Numerical analysis,
Time, Integration, Aerodynamic loading.             (U)
Pressure, Pitch(Inclination), Airfoils, Lift,
Finite element analysis, Mathematical models,       (U)
Computer programs
IDENTIFIERS: Airstream, Von Karmen equation,        (U)
WUAFOSR2307D9, PE61102F

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 908    5/10

NEW YORK UNIV N Y

Perception of Higher Derivatives of Visual    (U)
Motion.

DESCRIPTIVE NOTE: Interim scientific rept.  1 Jan-31
Dec 82,
    APR 83    5P    Kaufman,Lloyd ;Williamson,
Samuel J. ;
CONTRACT: AFOSR-82-0050
PROJ: 2313
TASK: A5
MONITOR: AFOSR  TR-83-0831

UNCLASSIFIED REPORT

ABSTRACT:    This document describes a basic
experiment involving the sensitivity of the visual
system to the modulation of speed of gratings moving
in one direction across the visual field. The
gratings were of different spatial frequencies, had
different average speeds, and the speeds were
modulated at different temporal frequencies. This
was done in two stages using the method of
adjustment. We also implemented a very
sophisticated computer program allowing us to use a
two-interval forced-choice paradigm in the context of
a modified staircase method for accurately measuring
thresholds for change of speed and how they are
affected by the foregoing parameters, and others as
well. Findings indicated that for all modulation
frequencies, sensitivity to acceleration was uniform
across all spatial frequencies at low average speeds.
As average speed increased, there was an increasing
monotonic increase in sensitivity for spatial
frequency. Acceleration is proportional to
modulation frequency as well as to the amplitude of
the modulation of speed.
DESCRIPTORS: *Vision, *Visual perception, Computer
programs, Threshold effects, Measurement,
Frequency, Modulation, Sensitivity,
Acceleration, Motion
IDENTIFIERS: PE61102F, WUAFOSR2313A5

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 917    6/16

PACIFIC UNIV FOREST GROVE OR COLL OF OPTOMETRY

Evaluation of Factors Producing Visual    (U)
Evoked Response Variability.

DESCRIPTIVE NOTE:  Final rept.  1 Jun 82-31 May 83,
    JUN 83    41P    Yolton,Robert L. ;
CONTRACT: AFOSR-82-0160
PROJ: 2313
TASK: A5
MONITOR: AFOSR  TR-83-0854

UNCLASSIFIED REPORT

ABSTRACT:    Ten steady-state visual evoked responses
(VERs) were recorded from each of 47 normal, adult
subjects. For each subject, the mean and standard
deviation for the ten VER amplitudes were
calculated and used to determine amplitude
variability. While some subjects produced extremely
reliable VERs, data from the majority showed a
consider   degree of variability. A number of
factors        ing trend, noise, attention,
binocula      accommodation, eye movements, artifacts
and electrode placement were evaluated to determine
their relative contributions to this variability.
Noise and trend factors produced a large proportion
of the variability (62%) while the other factors were
found to be relatively insignificant. (Author)    (U)
DESCRIPTORS: *Vision, Visual cortex,
Response(Biology), Stimuli, Data processing,
Eye movements, Amplitude, Hypnosis    (U)
IDENTIFIERS: Visual evoked response,    (U)
WUAFOSR2313A5, PE61102F

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AD-A133 917       AD-A133 908    22       EVJ43D

AD-A133 901      20/12    7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

Electronic and Lattice Modes of Graphite-
CoCl2.                                                    (U)

        83       8P      Lowe,C. W. ;Nicolini,C. ;
Dresselhaus,G. ;
CONTRACT: F49620-83-C-0011
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0756

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in MRS Symposium on
  Intercalated Graphite, p93 1983.
  Reprint: Electronic and Lattice Modes of Graphite-
  CoCl2.

DESCRIPTORS: *Graphite, *Cobalt compounds,
  *Dielectric properties, *Electronic states,
  Reflectivity, Optical properties, Measurement,
  Energy bands, Vibrational spectra, Reprints    (U)
IDENTIFIERS: GIC(Graphite Intercalation
  Compounds), WUAFOSR2306C3, PE61102F            (U)

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AD-A133 907      3/2

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS

Very Large Array Observations of Solar
Active Regions. IV. Structure and Evolution
of Radio Bursts from 20 cm Loops.               (U)

DESCRIPTIVE NOTE: Interim rept.,
    JUL 83     30P      Willson,Robert F. ;Lang,
Kenneth R. ;
CONTRACT: AFOSR-83-0019
PROJ: 2311
TASK: A1
MONITOR: AFOSR TR-83-0843

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A133 742.
ABSTRACT:    The Very Large Array (VLA) has
  been used to study the structure and evolution of six
  solar bursts near 20 cm wavelength. In most cases
  the burst emission has been resolved into looplike
  structures with total lengths, approx. 3 x 10 to the
  minus 9th power cm, brightness temperatures approx.
  10 to the 7th to 8th power K and degrees of
  circular polarization approx. or 90%. Changes in
  the total intensity and circular polarization of the
  bursts occur on timescales as short as ten seconds.
  The individual peaks of one multiple component
  burst originated in different locations within a
  magnetically complicated region. Preburst heating
  and circular polarization changes respectively
  occurred minutes before the onset of the impulsive
  phase of two bursts. In one case a loop system
  emerged in the vicinity of the impulsive source, and
  two adjacent loop systems may have emerged and
  triggered the burst.                           (U)
DESCRIPTORS: *Solar corona, *Solar activity,
  Loops, Magnetic fields, Sources, Radiofrequency
  pulses, Brightness, Intensity, Variations, Solar
  radio maps, Multibursts, Radio astronomy, Radio
  interferometry, Arrays, Polarization, Solar
  structure, Evolution(General), Solar physics  (U)
IDENTIFIERS: Very large array, Solar radio bursts,
  Circular polarization, PE61102F,
  WUAFOSR2311A1                                  (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 895    12/1    9/2    17/7

WRIGHT STATE UNIV DAYTON OH DEPT OF SYSTEM ENGINEERING

A General Measurement Design Philosophy for the Kalman Filter Estimation with Special Application Given to the Imaging Radar Autofocus Update.    (U)

DESCRIPTIVE NOTE: Final rept. 1 May 82-30 Apr 83,
        83    91P    McCormick,William S. ;
CONTRACT:  AFOSR-82-0127
PROJ:  2305
TASK:  D9
MONITOR:  AFOSR  TR-83-0857

UNCLASSIFIED REPORT

ABSTRACT:    The value of an Autofocus update of an INS is investigated. Three cases are considered: (1) centripedal acceleration only; (2) centripedal and line-of-sight acceleration; and (3) centripedal and line-of-sight acceleration as well as attitude error effects. The extended kalman filter configuration was employed using the versatile SOFE Monte Carlo simulation program. Measurement matrices were defined for each of the three cases. Simulation results indicated an observability problem for Case (1). Suggestion for further work was included. For the centripedal acceleration case only, the Autofocus measurement proved to be a useful measurement when supplemented by additional measurements. In particular, a Compass, an Autofocus, and doppler velocity update realize better than a 94% update quality. Without the Autofocus, the quality suffers greatly. (Author)    (U)
DESCRIPTORS:  *Kalman filtering, *Estimates, *Computerized simulation, *Monte Carlo method, *Inertial navigation, Synthetic aperture radar, Configurations, Measurement, Acceleration, Line of sight, Aircraft, Trajectories, Signal to noise ratio, Doppler systems, Velocity, Automatic, Focusing    (U)
IDENTIFIERS:  Imaging radar, SOFE computer program, Autofocus, WUAFORS2305D9, PE61102F

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 896    7/4    20/6

CHICAGO UNIV IL

Study Ion-Solid Interactions and Material Characterization with a New High-Resolution Scanning Ion Probe.    (U)

DESCRIPTIVE NOTE: Final rept. 1 Jun 82-31 May 83,
    JUN 83    35P    Levi-Setti,Riccardo ;
CONTRACT:  F49620-80-C-0074
PROJ:  2305
TASK:  A9
MONITOR:  AFOSR  TR-83-0765

UNCLASSIFIED REPORT

ABSTRACT:    The program is a collaboration between the University of Chicago and Hughes Research Labs. The major goal is to produce two 60 KeV high resolution (10-100 A), high current density (1 A/sq cm) ion microscopes microprobes. The project is partly funded by the NSF. During the first year of the program, the basic optical and overall engineering design of the two ion microprobes was consolidated, with the procurement and contraction phase being completed near the end of the second year.    (U)
DESCRIPTORS:  *Ions, *Solids, *Microscopy, *Analytical chemistry, Microprobes, Interactions, Gallium, Liquid metals, Ion bombardment, Electrons, Emission, Images, Contrast, Topography, Crystallography, Data acquisition, Data processing, Mass spectrometers, Microprocessors, Circuits, Parts, Fabrication, Procurement    (U)
IDENTIFIERS:  SIM(Selected Ion Monitoring), SIMS(Secondary Ion Mass Spectrometry), Ion probes, WUAFOSR2305A9, PE61102F    (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 887   9/3   12/1

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT OF ELECTRICAL ENGINEERING

Iterative Reconstruction of Space-Limited Scenes from Noisy Frequency-Domain Measurements.   (U)

DESCRIPTIVE NOTE: Technical rept.,
  APR 83   6P   Beex,A. A. ;
CONTRACT: AFOSR-82-0234
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-83-0768

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE International Conference on Acoustics, Speech, and Signal Processing, p147-150, 14-16 Apr 83. Reprint: Iterative Reconstruction of Space-Limited Scenes from Noisy Frequency-Domain Measurements.

DESCRIPTORS: *Mathematical models, *Optical detectors, *Noise(Electrical and electromagnetic), Iterations, Signal processing, Measurement, Extrapolation, Frequency, Algorithms   (U)
IDENTIFIERS: PE61102F, WUAFOSR2304A2   (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 894   20/4   21/5

GEORGE WASHINGTON UNIV WASHINGTON DC SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Research on Nonsteady Flow Induction.   (U)

DESCRIPTIVE NOTE: Annual rept. 1 Mar 82-23 Feb 83.
  JUL 83   11P   Garris,Charles A. ;Foa, Joseph V. ;
REPT. NO. GWU-SEAS-TR-83-FI-3
CONTRACT: F49620-80-C-0043
PROJ: 2307
TASK: A1
MONITOR: AFOSR TR-83-0840

UNCLASSIFIED REPORT

ABSTRACT:   A Flow Induction laboratory has been set up at The George Washington University for use in this project. Experimental work on the generation of rotary-jet and on the generation of rotary-jet pseudoblades through the utilization of propagating stall has produced encouraging performance results and useful new information. Additional observations have been made on the energetics of eddy formation. Improvements have been made in the design of rotary jets, and studies of further such improvements have been initiated. (Author)   (U)

DESCRIPTORS: *Jet flow, *Eddies(Fluid mechanics), *Energy transfer, Laboratories, Mixing, Turbulence, Interfaces, Pressure, Exchange, Cascade structures, Rotation, Momentum, Kinetic energy, Pulses, Ejectors, Stalling, Propagation, Thrust augmentation, Secondary flow, Lift, Propulsion systems, Energetic properties   (U)
IDENTIFIERS: *Flow induction, Nonsteady flow, Secondary flow prerotation, Rotary jet pseudoblades, Pseudoblades, Eddy formation, WUAFOSR2307A1, PE61102F   (U)

AD-A133 873        11/6

ILLINOIS UNIV AT URBANA DEPT OF METALLURGY AND MINING ENGINEERING

Rapid Solidification Processing and Powder Metallurgy of Al Alloys.    (U)

DESCRIPTIVE NOTE: Annual rept. 15 Apr 82-14 Apr 83.
  SEP 83  68P      Fraser,Hamish L. ;
CONTRACT: AFOSR-82-0186
PROJ: 2306
TASK: A1
MONITOR: AFOSR  TR-83-0826

UNCLASSIFIED REPORT

ABSTRACT:    During the first period of performance, three tasks have been undertaken. These involve first a study of the specific microstructural changes that accompany rapid solidification of a number of Al alloys together with a determination of the thermal stability of these microstructures, second the production of rapidly solidified particulate and third the use of dynamic powder compaction (DPC) for the consolidation of rapidly solidified particulate in the absence of prolonged thermal excursions. A number of alloys have been rapidly solidified using laser surface melting and melt-spinning and in each case the observed microstructure has been interpreted in terms of the undercooling achieved during processing. Rapidly solidified (gas atomized) powders of 7091 have been consolidated using DPC. Is has been shown that bulk samples may be produced that are close to theoretical density.    (U)
DESCRIPTORS:  *Aluminum alloys, *Solidification, *Powder metallurgy, *Powder metals, Quick reaction, Lasers, Melting, Thermal stability, Phase transformations, Microstructure, Particulates, Compacting, Cooling, Heat treatment, Refining, Thermal resistance, Hardness, Strength(General), Dendritic structure, Iron, Molybdenum, Cerium
IDENTIFIERS: WUAFOSR2306A1, PE61102F    (U)
                                         (U)

AD-A133 873

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AD-A133 874    21/2    20/4    7/4

CALIFORNIA INST OF TECH PASADENA

Chemical Reactions in Turbulent Mixing Flows. Revision.    (U)

DESCRIPTIVE NOTE: Annual rept. 15 Apr 81-14 Apr 82.
  AUG 83  48P    Liepmann,H. W. ;Broadwell,
J E. ;Dimotakis,P. E. ;Roshko,A. ;
CONTRACT: F49620-79-C-0159
PROJ: 2308
TASK: A2
MONITOR: AFOSR  TR-83-0865

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Revision of report dated 25 Oct 82.
ABSTRACT:    Work under this contract has proceeded along three main lines, an experimental program covering low heat release combustion of hydrogen and fluorine, and chemically reacting turbulent shear layers and jets in water, a theoretical model development program whose aim is to provide alternatives to gradient diffusion transport models, and a diagnostics development parallel program to advance the state-of-the-art in experimental techniques, as dictated by our main experimental effort. Substantial progress has been made in all three areas. Notably, in the experimental program, we have completed a first set of measurements in our H2 + F2 combustion facility, as well as laser induced fluorescence measurements of chemically reacting jets and shear layers in water. These experiments prove conclusively that gradient transport models are inappropriate in describing these flows. In the theoretical area, we have shown good agreement between a simple mixing model, developed under this contract sponsorship, and our measurements. In the diagnostics area, important advances have been made in laser Doppler velocimeter, high speed thermometry, laser induced fluorescence and others.    (U)
DESCRIPTORS:  *Combustion, *Turbulent flow, *Chemical reactions, Hydrogen, Fluorine, Heat of combustion, Turbulence, Shear properties, Mixing, Layers, Entrainment, Thermal analysis, Models, Laser induced fluorescence, Laser velocimeters
IDENTIFIERS: PE61102F, WUAFOSR2308A2    (U)

AD-A133 874

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 868    8/7    7/2    7/4    7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS SCIENCE AND ENGINEERING

Commensurate-Glass Phase Transitions in Staged SbC15-GIC,    (U)

;Hobbs,L. W. ;Dresselhaus,M. S. ; Salamanca-Riba,L. ;Timp,G.

83    8P
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0751

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in MRS Symposium on Intercalated graphite, p9 1983. Reprint: Commensurate-Glass Phase Transitions in Staged SbC15-GIC.

DESCRIPTORS: *Graphite, *Antimony, *Chlorides *Phase transformations, Glass, Low temperature, Crystal structure, Transition temperature, Electron diffraction, X ray diffraction, Cooling, Heating, Layers, Two dimensional, Crystal lattices, Molecular structure, Reprints    (U)
IDENTIFIERS: *Intercalary compounds, PE61102F, WUAFOSR2306C3    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 869    8/7    20/6    7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS SCIENCE AND ENGINEERING

A Study of the Temperature-Dependence of Low-Frequency, Raman-Active Phonons in Stage-2 Graphite-K and Graphite-Rb Intercalation Compounds.    (U)

;Al-Jishi,R. ;Dresselhaus,G. ; Giergiel,J. ;Eklund,P. C.

83    7P
CONTRACT: F49620-83-C-0011, F49620-81-C-0006
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0749

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in MRS Symposium on Intercalated Graphite, p213 1983. Reprint: A Study of the Temperature-Dependence of Low-Frequency Raman-Active Phonons in Stage-2 Graphite-K and Graphite Rb Intercalation Compounds.

DESCRIPTORS: *Graphite, *Phonons, *Light scattering, *Raman spectra, Rubidium, Potassium, Low frequency, Temperature, Lattice dynamics, Models, Phase transformations, Transition temperature, Crystal lattices, Layers, Reprints    (U)
IDENTIFIERS: *Intercalary compounds, Raman scattering, PE61102F, WUAFOSR2305C3    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 866    8/7    7/2    20/3    7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE

Susceptibility of Magnetic Graphite-CoCl2
Intercalation Compounds.                          (U)

83    7P    Elahy,M.;Dresselhaus,G.;
CONTRACT: F49620-83-C-0011, F49620-81-C-0006
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0759

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in MRS Symposium on
   Intercalated Graphite, p207 1983.
Reprint: Susceptibility of Magnetic Graphite-
CoCl2 Intercalation Compounds.

DESCRIPTORS: *Graphite, *Cobalt compounds,
*Chlorides, *Magnetic properties, Magnetization,
Vulnerability, Temperature, Measurement, Two
dimensional, Models, Layers, Magnetic moments,
Interactions, Diamagnetism, Phase transformations,
Crystal lattices, Ferromagnetic materials, Sheets,
Magnetic fields, Mathematical analysis,         (U)
Reprints
IDENTIFIERS: *Intercalary compounds, PE61102F,    (U)
WUAFOSR2306C3

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 867    20/2    8/7    7/4    7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE

Lattice Dynamical Model for Graphite-
Bromine Intercalation Compounds.                  (U)

G.    83    7P    Al-Jishi,R.;Dresselhaus.
CONTRACT: F49620-83-C-0011, F49620-81-C-0006
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0752

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in MRS Symposium on
   Intercalated Graphite, P301 1983.
Reprint: Lattice Dynamical Model for Graphite-
Bromine Intercalation Compounds.

DESCRIPTORS: *Lattice dynamics, *Graphite, *bromine
compounds, Crystal lattices, Models, Computations,
Low frequency, Molecules, High frequency,
Brillouin zones, Layers, Phonons, Dispersing,
Raman spectroscopy, Infrared spectroscopy, Specific
Inelastic scattering, Neutron scattering, Specific
heat, Phase transformations, Light scattering,    (U)
Electronic states, Reprints
IDENTIFIERS: *Intercalary compounds, PE61102F,    (U)
WUAFOSR2306C3

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 864    21/2

PRINCETON UNIV NJ DEPT OF MECHANICAL AND AEROSPACE
ENGINEERING

High Temperature Catalytically Assisted
Combustion.                                                    (U)

DESCRIPTIVE NOTE: Final rept. 1 Aug 82-28 Jan 83,
    JAN  83    11P    Bracco,F. V. ;Royce.B. ;
S. H. ;Santavicca.D. A. ;
CONTRACT: AFOSR-81-0248
PROJ: 2308
TASK: A2
MONITOR: AFOSR  TR-83-0866

UNCLASSIFIED REPORT

ABSTRACT:   Results of research on a two-
dimensional, transient catalytic combustion model and
on a high-temperature perovskite catalyst are
presented. A recently developed two-dimensional,
transient model has been used to study the ignition
of CO/air mixtures in a platinum coated catalytic
honey comb. Comparisons between calculated and
measured steady state substrate temperature profiles
and exhaust gas compositions show good agreement. A
platinum-doped perovskite catalyst has been designed
to exhibit low temperature light off and high
temperature stability. Preliminary tests using a
perovskite powder with one percent by weight platinum
are encouraging, showing very little change in
surface activity when used with propane fuel.
(Author)                                                      (U)

DESCRIPTORS:  *Combustion, *Catalysts,
*Perovskites, *Carbon monoxide, Air, Mixtures,
Propane, Honeycomb structures, Platinum, Metal
coatings, Substrates, Two dimensional, Transients,
Doping, Coupling(Interaction), Powders,
Thermal stability, High temperature, Models,
Combustors, Catalytic cracking                                (U)
IDENTIFIERS: Catalytic combustion,
WUAFOSR2308A2, PE61102F                                       (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 863    7/3    7/4    20/2

MASSACHUSETTS INST OF TECH CAMBRIDGE

Structure and Phase Transitions in Bromine
and Potassium-Mercury Intercalated Graphite,                  (U)

    APR  83    21P    Erbil.A. ;Timp,G. ;Kortan,
A. R. ;Birgeneau,R. J. ;Dresselhaus,M. S. ;

CONTRACT: F49620-83-C-0011
PROJ: 2306
TASK: C3
MONITOR: AFOSR  TR-83-0761

UNCLASSIFIED REPORT

ABSTRACT:    High resolution x-ray scattering and
electron microscopy results relevant to the in-plane
structure of two prototype graphite intercalation
compound (GIC) systems, Br2-GIC and KHgx-
GIC, are presented. Particular emphasis is given
to intercalation kinetics and to structural
coherence. Of special interest is the measurement
using high resolution x-ray scattering of an
intrinsic in-plane intercalate domain size in Br2-
GIC larger than 10,000. Evidence is presented for
the formation of a two-dimensional incommensurate
domain wall structure for the Br2 intercalant along
the 7-fold direction above T sub C = 69.08 C
for stage 4 C28Br2. Evidence is also presented
in the same compound for two-dimensional anisotropic
melting at T sub M = 100.25 C. Large
dislocation-free regions (100 a x 500 a) are observed
directly in the lattice fringe images of a stage 1
KHg-GIC sample.                                               (U)
DESCRIPTORS:  *Graphite, *Phase transformations,
*Crystal structure, *Molecular structure, Bromine,
Potassium, Mercury, Interfaces, Reaction
kinetics, Anisotropy, Melting, Domain walls,
Dislocations, Crystal lattices, Layers,
Prototypes, Coherence, Two dimensional, X ray
scattering, Electron microscopy, Single crystals             (U)
IDENTIFIERS:  Intercalary compounds,
WUAFOSR2306C3, PE61102F                                       (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 861    20/3    8/7

MASSACHUSETTS INST OF TECH CAMBRIDGE

The Anomalous Magnetoresistance of Graphite at High Magnetic Fields.    (U)

MAY 83    18P    Timp,G. ;Dresselhaus,P. D. ;Chieu,T. C. ;Dresselhaus,G. ;Iye,Y. ;
CONTRACT: F49620-83-C-0011
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0760

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Bell Labs., Murray Hill, NJ.
ABSTRACT: The angular dependence of the high field magnetoresistance anomaly in graphite is reported. The observed angular dependence is consistent with the functional form for the phase boundary of a charge density wave transition suggested Yoshioka and Fukuyama. Sharp periodic features in the resistivity occurring after the onset of the anomaly are reported.    (U)
DESCRIPTORS: *Magnetoresistance, *Magnetic anomalies, *Magnetic fields, *Graphite, Electric charge, Charge density, Waves, Stability, Phase transformations, Angles, Temperature, Crystal structure, Oscillation, Fermi surfaces, Reprint    (U)
IDENTIFIERS: WUAFOSR2306C3, PE61102F    (U)

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PAGE    30

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 862    7/2    8/7    20/3    7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE

A Model for Superconductivity in Graphite Intercalation Compounds.    (U)

DEC 82    19P    Al-Jishi,R. ;
CONTRACT: F49620-83-C-0011, F49620-81-C-0006
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0762

UNCLASSIFIED REPORT

ABSTRACT: The observed superconductivity in the stage 1 graphite-alkali metal intercalation compounds (GICs) is modeled using both graphite Pi-bands and intercalate s-bands. The anisotropy observed in the superconducting properties is explained in terms of the anisotropy of the Fermi surfaces of the GICs.    (U)
DESCRIPTORS: *Graphite, *Alkali metal compounds, *Superconductivity, Superconductors, Conduction bands, S band, Models, Anisotropy, Fermi surfaces, Potassium, Rubidium, Cesium, Transition temperature, Pressure, Stoichiometry    (U)
IDENTIFIERS: Intercalary compounds, Pi band, WUAFOSR2306C3, PE61102F    (U)

AD-A133 862    UNCLASSIFIED

## Entry 1

MASSACHUSETTS INST OF TECH CAMBRIDGE

Magnetic Properties of CoCl2-Intercalated Graphite,  (U)

APR 83  16P  Elahy,M. ;Shayegan,M. ;
Szeto,K. Y. ;Dresselhaus,G. ;

UNCLASSIFIED REPORT

ABSTRACT:  The temperature and magnetic field dependence of the magnetic susceptibility and heat capacity of graphite-CoCl2 are investigated to understand the role of dimensionality in the observed magnetic phase transitions. The structure of graphite-CoCl2 shows similarities between the magnetic layers of Co(+2) in pristine and in the intercalated CoCl2 compound. However, microstructural analysis shows the presence of small islands of magnetic ions. The theoretical model for the 2-dimensional planar magnets is extended to include small magnetic domains. The finite size effect analysis shows good agreement between the experimental and theoretical results. The presence of external magnetic fields demonstrates the static scaling hypothesis for the magnetic susceptibility and heat capacity.  (U)

DESCRIPTORS: *Magnetic properties, *Graphite, *Cobalt, *Chlorides, Temperature, Magnetic fields, Magnetization, Vulnerability, Specific heat, Phase transformations, Layers, Microstructure, Ions, Models, Two dimensional, Mathematical analysis, Reprints  (U)

IDENTIFIERS: *Intercalary compounds, WUAFOSR2306C3, PE61102F  (U)

## Entry 2

UNCLASSIFIED

FLORIDA UNIV GAINESVILLE DEPT OF ELECTRICAL ENGINEERING

Study of 1/f Noise in Solids.  (U)

DESCRIPTIVE NOTE: Annual rept. 16 Jun 82-15 Jun 83,
83  138P  Van Vliet,Carolyn M. ;
Bosman,Gijs ;

UNCLASSIFIED REPORT

ABSTRACT:  Noise measurements were made on gold metal films. The noise above 150K is of the form 1/f to the 1.2 power; below 150K the noise goes as 1/f with a maximum near 80K, then a continued decrease. The noise in GaAs n+n-n+ mesas of submicron dimensions is very low. The Hooge parameter is of the order of 10 to the minus 7th power, indicating that collisions are nearly absent. Intervally electron transfer is noticeable in samples with 1.1 micrometer dimensions. The n+p-n+ structures have a great deal of noise associated with the prepunch-through current. This is attributed to recombination of injected electrons via empty acceptors, since in the unexcited specimen there are no holes due to electron spillover. For the first time 1/f noise was observed in radioactive alpha particle decay from 241 Americium. This noise was deduced from counting statistics using the Allan variance theorem. Calculations yielded quantitative accounts for the mobility-fluctuation noise associated with impurity scattering for silicon and gold.  (U)

DESCRIPTORS:  *Semiconductors, *Metal films, *Noise, Temperature, Gold, Gallium arsenides, Charge carriers, Alpha particles, Electron transfer, Silicon, Transport properties  (U)

IDENTIFIERS: One over f noise, WUAFOSR2305C1, PE61102F  (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A133 854        20/4

MICHIGAN STATE UNIV EAST LANSING DEPT OF MECHANICAL
ENGINEERING

New Results, a Review and Synthesis of the
Mechanism of Turbulence Production in
Boundary Layers and Its Modifications,

   JAN 83    19P    Falco,R. E. ;
CONTRACT:  F49620-82-K-0003
PROJ:  2307
TASK:  A2
MONITOR:  AFOSR  TR-83-0738

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Pub. in Proceedings of AIAA
Aerospace Sciences Meeting (21st), 10-13 Jan 83.
Reprint: New Results, a Review and Synthesis of
the Mechanism of Turbulence Production in Boundary
Layers and Its Modifications.

DESCRIPTORS:  *Turbulent boundary layer,
Eddies(Fluid mechanics), Modification, Reprin    (U)
IDENTIFIERS:  WUAFOSR2307A2, PE61102F              (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 855        9/5        20/12        20/6

CINCINNATI UNIV OH

Integration of Detectors with Optical                  (U)
Waveguide Structures.

DESCRIPTIVE NOTE:  Interim technical rept. 15 Mar 82-14
  Mar 83.
   MAY  83    40P    Boyd,J. T. ;
CONTRACT:  AFOSR-81-0130
PROJ:  2305
TASK:  B1
MONITOR:  AFOSR  TR-83-0796

UNCLASSIFIED REPORT

ABSTRACT:    Progress in several areas regarding the
integration of photodetector arrays with optical
waveguide structures is presented. A photosensor
element suitable for incorporation into charge-
coupled device (CCD) imaging arrays in which the
charge injected into the CCD is proportional to the
logarithm of incident light intensity has been
successfully demonstrated. The photosensor element
consists of a photodiode directly coupled to a two
stage MOSFET common source amplifier. This
element occupies an area of 25 micron x 100 micron
and is arranged so that it could be incorporated into
a linear CCD imaging array having a period of 25
micron. A logarithmic response is measured over a
68.6 dB range of incident light intensity with a
sensitivity of 55 mV per decade of light intensity.
The concept of illuminating a silicon photodetector
along an edge to increase the light propagation path
through the depletion region and thus to increase
quantum efficiency at near infrared wavelengths has
also been successfully demonstrated. Quantum
efficiency measurements using both a GaAlAs
laser and a HeNe laser are included. These
measurements show an improvement in quantum
efficiency at lambda = 0.83 micron for edge
illumination over normal incidence of 75% for a
photodiode and of 142% for a MOS capacitor
photosensor.                                          (U)

DESCRIPTORS:  *Integrated systems, *Optical
waveguides, *Photodetectors, *Gallium arsenides,
Charge coupled devices, Semiconductor lasers,
Quantum efficiency, Light transmission, Near
infrared radiation, Lithium niobates, Logarithm      (U)
IDENTIFIERS: Integrated optics, Gallium aluminum     (U)
AD-A133 855

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 853    21/5    20/11    20/4

PURDUE UNIV LAFAYETTE IN SCHOOL OF MECHANICAL ENGINEERING

Research on Aero-Thermodynamic Distortion Induced Structural Dynamic Response of Multi-Stage Compressor Blading.    (U)

DESCRIPTIVE NOTE: Annual summary rept. 15 Apr 82-14 Apr 83,
   JUN  83    56P    Fleeter Sanford ;
REPT. NO. ME-TSPC-TR-83-04
CONTRACT: AFOSR-82-0188
PROJ: 2307
TASK: A4
MONITOR: AFOSR TR-83-0737

UNCLASSIFIED REPORT

ABSTRACT:     The overall objective of this research is to quantitatively investigate the fundamental phenomena relevant to aerothermodynamic distortion-induced structural dynamic blade response in multi-stage gas turbine fans and compressors. Unique unsteady aerodynamic data will be obtained to validate and indicate necessary refinements to state-of-the-art analyses and to direct the modeling of new analyses. Also, for the first time, a first principles capability to predict the vibrational response amplitude of blading due to aerodynamic excitations will be developed. Progress and results obtained during the first year of this program. Include: the dynamic instrumentation of the first-stage vane row of a three-stage research compressor; the design, specification, and initiation of the development of the dynamic data acquisition and analysis system: the initiation of the development of the necessary data analysis and calibration techniques; and the theoretical development of a unique coupled mode structural dynamic blade response analysis based on an energy balance technique.    (U)
DESCRIPTORS: *Turbomachinery, *Distortion, *Vibration, *Aerothermodynamics, Excitation, Structural response, Dynamic response, Unsteady flow, Turbine parts, Mathematical prediction, Fan blades, Gas turbine blades, Compressor blades, Resonance, Perturbations, Fluid mechanics, Interactions, Data acquisition, Calibration    (U)
IDENTIFIERS: Aerothermodynamic distortion, Inlet FLOW, Forced vibration, Forcing functions,    (U)
AD-A133 853

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AD-A133 852    9/1    20/12

HOWARD UNIV WASHINGTON DC DEPT OF ELECTRICAL ENGINEERING

Development of Short Gate Fet's.    (U)

DESCRIPTIVE NOTE: Annual rept. Jun 80-Jun 81,
   83    23P    Spencer,Michael G. ;
CONTRACT: AFOSR-81-0223
PROJ: 2305
TASK: C1
MONITOR: AFOSR TR-83-0766

UNCLASSIFIED REPORT

ABSTRACT:     A summary of initial work performed under Air Force contract 'Development of Short Gate Fet's' is presented. Approach taken toward fabrication of high speed fet's is discussed. Expected materials and fabrication problems are outlined. (Author)
DESCRIPTORS: *Field effect transistors, *Gates(Circuits), *Gallium arsenides, Fabrication, Schottky barrier devices, Submillimeter waves, Epitaxial growth, Short range(Distance), High rate, Molecular beams, Air Force procurement, Chromium, Ion implantation, Q band, Space charge
IDENTIFIERS: Speed(Fabrication), MOCVD(Metal Organic Chemical Vapor Deposition), Short gates, Electron ballistics, Submicron structures, Buffer layers, Hall mobility, WUAFOSR2305C1, PE61102F

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 851    9/5    12/1    9/2

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF
ELECTRICAL ENGINEERING

Fast Convolution Algorithms and Associated    (U)
VHSIC Architectures.

DESCRIPTIVE NOTE: Final rept. 15 Apr 80-15 Apr 83,
    MAY 83    22P    Reed,Irving S. ;
CONTRACT: AFOSR-80-0151
PROJ: 2304
TASK: A3
MONITOR: AFOSR TR 83-0748

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Doctoral thesis.
ABSTRACT:    In this final report the publications of
    the past five years that were supported by this grant
    are listed. There are 48 papers and 6 Ph.D
    dissertations listed in the final report. The
    publications fall into five categories or groups. A
    brief summary of each group is given. Finally an
    abstract of each paper/dissertation is given in the
    report. (Author)    (U)
DESCRIPTORS: *Algorithms, *Integrated circuits,
    *Convolution, *Computer architecture, Digital
    filters, Coding, High rate, Abstracts,
    Bibliographies, Architecture, Documents    (U)
IDENTIFIERS: Convolution algorithms, Cyclic
    convolutions, Fast convolution algorithms,
    Polynomial transforms, Reed Solomon codes,
    Inner product computers, Fermat number, Mersenne
    prime, High speeds, Gaolis theory, Omega    (U)
    filters, WUAFOSR2304A3, PE61102F

AD-A133 851    UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 847    12/2

CALIFORNIA UNIV BERKELEY OPERATIONS RESEARCH CENTER

A Random Walk Subject to a Randomly    (U)
Changing Environment.

DESCRIPTIVE NOTE: Research rept.,
    SEP 83    17P    Ross,Sheldon M. ;
REPT. NO. ORC-83-9
CONTRACT: AFOSR-81-0122
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0966

UNCLASSIFIED REPORT

ABSTRACT:    A common model for the changes over time
    of the price (or sometimes the logarithm of the
    price) of a commodity is the random walk model.
    This is a Markov model which supposes that the
    change in price in any time period is a random
    variable, independent of the past, and having a given
    distribution F. In this note, we propose a
    generalized model in which the distribution of price
    change at any time depends upon the (environmental
    state) at that time. That is, we suppose that if
    sub Sn and sub Yn represent the price and the
    environmental state at time in n then, given sub Yn
    = i, sub Sn+1 - Sn is a random variable with
    distribution Fi. We also suppose that the
    environmental state changes in a Markovian fashion.
    An application of this model to a stock option
    example is presented. (Author)    (U)
DESCRIPTORS: *Monte Carlo method, *Operations
    research, Random variables, Costs, Probability,
    Markov processes, Environments    (U)
IDENTIFIERS: Random walk, WUAFOSR2304A5,    (U)
    PE61102F

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 838    7/4    8/7    7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS
SCIENCE AND ENGINEERING

Structural Phase Transitions in Graphite
Intercalation Compounds.    (U)

JUL 83    4P    Erbil.A. ;Timp.G. ;Kortan,
A. R ;Birgeneau.R. J. ;Dresselhaus.M S. ;

CONTRACT: F49620-83-C-0011. DAAG29-80-C D104
PROJ: 2306
TASK: C3
MONITOP: AFOSR TR-83-0758

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE. Pub. in Carbon Conference (15(h)
p.227-228, 18-22 Jul 83.
Reprint: Structural Phase Transitions in Graphite
Reprint: Intercalation Compounds.

DESCRIPTORS: Phase transformations. ;Graphite
;Microstructure. ;Crystal structure. Single
crystals. Kinetics. Breaking compounds. Potassium
Mercury. Layers. Two dimensional. Temperature.
X ray scattering. X ray spectroscopy. Crystal
lattices. Bragg angle. Reprints    (U)
IDENTIFIERS: *Intercalary compounds.    (U)
WUAFOSR2306C3. PE611020

AD-A133 838    UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 836    7/4    20/10

NATIONAL BUREAU OF STANDARDS WASHINGTON DC QUANTUM
CHEMISTRY GROUP

Application of Quantum Chemistry to
Atmospheric Chemistry.    (U)

DESCRIPTIVE NOTE: Annual rept. 1 Oct 81-30 Sep 82.
SEP 82    31P    Krauss.M. ;Stevens.W. J. ;
CONTRACT: AFOSR-ISSA-82-0017
PROJ: 2301
TASK: A4
MONITOR: AFOSR TR-83-0785

UNCLASSIFIED REPORT

ABSTRACT.    Relativistic effective potentials have
been used to calculate the electronic structure and
spectroscopic properties of UO+. The excitation
energies of the excited states of UO+ were
calculated using a restricted valence configuration
interaction. Strong radiative transitions are
predicted in the red part of the visible. These
transitions are predominately atomic like f to d.    (U)
DESCRIPTORS: ;Quantum chemistry. ;Uranium compounds.
;Electronic states. ;Spectroscopy. Atomic energy
levels. Molecular orbitals. Excitation. Potential
energy. Ions. Radiative transfer. Oxides    (U)
IDENTIFIERS: Electronic structure. Relativistic    (U)
potentials. WUAFOSR2301A4, PE611020

AD-A133 836    UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 825    12/1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

On Alpha-Symmetric Multivariate Distributions.    (U)

JUN 83    22P    Cambanis,Stamatis ;Keener, Robert ;Simons,Gordon ;
CONTRACT: F49620-82-C-0009, NSF-MCS78-0120
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0821

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Multivariate Analysis, v13 n2 p213-233 Jun 83. Sponsored in part by NSF-MCS81-00748. Reprint: On Alpha-Symmetric Multivariate Distributions.

DESCRIPTORS: *Multivariate analysis, *Distribution functions, Symmetry, Vector analysis, Stochastic processes, Reprints    (U)
IDENTIFIERS: WUAFOSR2304A5, PE61102F    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 827    20/5    20/9    12/1

MICHIGAN UNIV ANN ARBOR

Theory of Transient Self-Focusing of a CO(2) Laser Pulse in a Cold Dense Plasma.    (U)

JUN 83    11P    Schmitt,A. ;Ong,R. S. B.

CONTRACT: AFOSR-80-0029
PROJ: 2301
TASK: A7
MONITOR: AFOSR TR-83-0847

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physics, v54 n6 p3003-3011 Jun 83. Reprint: Theory of Transient Self-Focusing of a CO(2) Laser Pulse in a Cold Dense Plasma.

DESCRIPTORS: *Light pulses, *Plasmas(Physics), *Carbon dioxide lasers, *Equations, Focusing, Self operation, Electromagnetic wave propagation, Reprints    (U)
IDENTIFIERS: *Laser pulses, WUAFOSR2301A7, PE61102F    (U)

AD-A133 818    20/11

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT OF AEROSPACE AND OCEAN ENGINEERING

Experimental Study of Active Vibration Control.    (U)

DESCRIPTIVE NOTE: Annual rept. 15 Mar 82-14 Mar 83.
APR 83    11P    Hallauer,William L. , Jr;
CONTRACT: AFOSR-82-0217
PROJ: 2307
TASK: B1
MONITOR: AFOSR  TR-83-0855

UNCLASSIFIED REPORT

ABSTRACT:    Control system hardware, including velocity sensors, force actuators, and analog circuitry, has been designed, fabricated, calibrated, and tested in operation. Active vibration control in the forms of direct-velocity-feedback control and modal-space control has been implemented on a dynamically uncomplicated beam-cable structure, and theoretical simulations of the structure-control dynamics have been completed. Either correlation between experiment and theory has been satisfactory, or the reasons for unsatisfactory correlation have become clear so that corrections can be made in the future. A dynamically complicated, variable-geometry plane grid structure intended for control experiments has been built and analyzed experimentally and theoretically for its modes of vibration. The initial versions of both the actual structure and its theorectical model was unsatisfactory in some respects, and necessary improvements are almost completed at this writing. Finally, the tasks of subcontractor HR Textron are almost completed. They consist of a study of the techniques known as component cost analysis and modal cost analysis and a preliminary study of issues involved in the testing of active vibration control systems of full-size satellite structures, most specifically whether testing should be conducted on the ground or in orbit. (Author)    (U)
DESCRIPTORS: *Vibration, *Control systems, Test methods, Velocity, Feedback, Frequency response, Cost analysis. Beams(Structural), Cables, Dynamic response. Correlation techniques, Operational effectiveness, Detectors, Actuators    (U)
IDENTIFIERS: *Vibration control, Velocity feedbac    (U)
AD-A133 818

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AD-A133 824    6/16    6/1

CALIFORNIA UNIV IRVINE DEPT OF PSYCHOBIOLOG,

Classification and Properties of Acidic Amino Acid Receptors in Hippocampus. 1. Electrophysiological Studies of an Apparent Desensitization and Interactions with Drugs with Block Transmission.    (U)

AUG 83    11P    Lynch,Gary ; Fagni Laurent ;Baudry,Michel
CONTRACT: AFOSR-82-0116; PHS MH-19793-11
PROJ  2312
TASK  K1
MONITOR  AFOSR  TR-83-0830

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Jnl. of Neuroscience. v3 r8 p1538-1546 Aug 83. Sponsored in part by Grant NSF-BNS81-12.56-01.
Reprint. Classification and Properties of Acidic Amino Acid Receptors in Hippocampus. 1. Electrophysiological Studies of an Apparent Desensitization and Interactions with Drugs with Block Transmission.    (U)

DESCRIPTORS: *Amino acids, *Chemoreceptors, Classification, Hippocampus, Electrophysiology. Interactions. Drugs. Desensitizing, Biochemistry. Neurochemical transmission. Reprints    (U)
IDENTIFIERS: WUAFOSR2312K1, PE61102F

AD A133 824    UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 817    20/3

RENSSELAER POLYTECHNIC INST TROY NY

Pressure Quenche  Excitonic Solids.    (U)

DESCRIPTIVE NOTE: Annual rept. Jul 81-Jul 82,
    JUL 82    8P    Brown,Edmond ;
CONTRACT: AFOSR-79-0126
PROJ: 230.
TASK: A8
MONITOR. AFOSR TR-83-0790

UNCLASSIFIED REPORT

ABSTRACT:    Theoretical models based on trapped
magnetic flux have been tried in order to account for
the behavior encountered in some early samples of
cadmium sulfide in a slowly varying magnetic field.
These models fail to account for the ferromagnetic
behavior seen at high fields, of the order of ten
kilogauss, although they qualitatively fit the
behavior for fields below one kilogauss. The models
make use of a network of superconducting filaments
containing a non equilibrium distribution of trapped
flux which can re-orient itself in a varying magnetic
field so as to reduce the free energy of the system.
Such a network is similar to an array of
superconducting loops which are orientable although
not completely free. If the low field strong
diamagnetism is to be attributed to
superconductivity, as has been previously suggested
we are not yet able to incorporate the high field
behavior into such a picture. It is possible that
the behavior seen in some samples of cuprous chloride
and in cadmium sulfide are due to a not yet
understood mechanism.    (U)

DESCRIPTORS:  *Superconductors, *Excitons,
*Quenching, High temperature, Trapping(Charged
particles), Ferromagnetic materials, Pressure,
Magnetic fields, Processing, Cadmium sulfides,
Diamagnetism
IDENTIFIERS:  PE61102F, WUAFOSR2301A8

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## DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 816    20/9

PRINCETON UNIV N J PLASMA PHYSICS LAB

Energetic Ion Beam-Plasma Interactions.    (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 81-28 Feb 83,
    JUN 83    8P    Kulsrud,Russell M. ;
CONTRACT: AFOSR-81-0106
PROJ: 2301
TASK: A7
MONITOR: AFOSR TR-83-0816

UNCLASSIFIED REPORT

ABSTRACT:    The main effort was to understand the
physics of a very energetic ion beam propagating
through a magnetized plasma roughly perpendicular to
the magnetic field. It has been appreciated for
several years that the central problem is the charge
neutralization of this beam. For conditions where
ion beam number density is comparable or larger than
plasma number density, the motion of the electrons is
quite complicated being controlled by the self fields
produced by their motion. Thus, to solve this
problem it was necessary to construct a rather
complex computer code. During the first year of
work the general nature of the electron motion was
elucidated and a 2-D model for the problem was
constructed that was sufficiently realistic to answer
the charge neutralization question in general. A
rough indication of the necessary amount of charge
neutralization, defined as the ratio of the
difference of electron and ion number densities in
the beam to the ion beam density, obtained and shown
to be v/c if the beam divergence is small enough.
Also it was shown that the beam would move along a
circular orbit with radius equal to the cyclotron
radius of an individual beam ion. It was shown that
the required axial variation to attain desired charge
neutralization were easy to achieve in practice.
Thus, it appears entirely possible to propagate an
energetic ion beam a long distance through a plasma
and to hold it together radially against expansional
forces.    (U)

DESCRIPTORS:  *Ion beams, *Magnetohydrodynamics,
Plasma sheaths, Ion ion interactions, Energetic
properties, Neutralization    (U)
IDENTIFIERS:  PE61102F, WUAFOSR2301A7    (U)

DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A133 811     14/2     21/2

GEORGE WASHINGTON UNIV WASHINGTON DC SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Multiangular Scanning Absorption Techniques for Three Dimensional Combustion Diagnostics     (U)

DESCRIPTIVE NOTE: Final rept. 1 Sep 77-31 Aug 82.
AUG 82     11P     Goulard,Robert ;

CONTRACT: AFOSR-77-3439
PROJ: 2308
TASK: A3
MONITOR: AFOSR TR-83-0862

UNCLASSIFIED REPORT

ABSTRACT: This program explored the potential of absorption techniques for low ppm, real time three-dimensional combustion diagnostics. Convolution, Fourier transforms and iterative algorithms have already been proven in x-ray absorption tomography and interferometric applications. They have been tested and compared for their ability to determine typical pollutant and radical concentrations as they appear in flames or exhausts. The effect of the number of scans has been analyzed for parallel beams. A satisfactory trade off was shown to exist between accuracy and the number of viewing angles. The potential of this method was demonstrated in the laboratory.     (U)

DESCRIPTORS: *Diagnostic equipment, *Tomography, *Optical equipment, *Combustion, Scanning, Absorption, Three dimensional, Real time, Exhaust flames, Axially symmetric flow, Soot, Flames, Laser beams, Beam steering.     (U)
IDENTIFIERS: Combustion, PE61102F, WUAFOSR2308A3     (U)

AD-A133 811

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DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO.     EVJ43D

AD-A133 809     11/2     13/3     20/11     11/4

NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

Fracture Toughness of Fiber Reinforced Concrete.     (U)

DESCRIPTIVE NOTE: Progress rept. Jun 82-Jun 83.
JUN 83     84P     Wecharatana,M. ;Shah,S. P.

CONTRACT: AFOSR-82-0243
PROJ: 2307
TASK: C2
MONITOR: AFOSR TR-83-0876

UNCLASSIFIED REPORT

ABSTRACT: For fiber reinforced cement based composites, the principal beneficial effects of fibers (metallic, mineral or organic) accrue after the matrix has cracked. For loads beyond which the matrix has initially cracked, the further crack extension and opening is resisted by bridging of fibers across the cracks. The resistance provided by the fibers will depend principally on the debonding and the pull-out resistance of fibers. A theoretical model based on the concepts of nonlinear fracture mechanics to predict the resistance provided by the fibers against the fracture of matrix is presented in this report. The theoretically predicted response is compared favorably with the experimental data on notched beams and double cantilever beam specimens of steel fiber reinforced concrete. The proposed theoretical model provides a method to calculate fracture resistance for a crack extension in a specimen of any geometry. One of the key parameters required for the model is the relationship between the uniaxial post-cracking stress and the corresponding displacement. This relationship will depend on the bond-slip function of fibers. A method to estimate this relationship is presented.     (U)

DESCRIPTORS: *Reinforced concrete, *Fracture(Mechanics), *Toughness, Fiber reinforced composites, Cements, Matrix materials, Cracking(Fracturing), Loads(Forces), Crack propagation, Resistance, Bridges, Fibers, Mathematical models, Predictions, Beams(Structural), Steel, Tensile stress.
IDENTIFIERS: PE61102F, WUAFOSR2307C2     (U)
AD-A133 809     (U)

AD-A133 808 20/4

TEL AVIV UNIV (ISRAEL) DEPT OF FLUID MECHANICS AND HEAT
TRANSFER

On the Relationship between Transitional and
Fully Turbulent Shear Flow (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 77-31 Mar 82
MAY 82 156P Wygnanski,I ;Eilrav,S ;
CONTRACT: AFOSR-77-3275
PROJ: 2307
TASK: A2
MONITOR: AFOSR TR 83-0806

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: [illegible] report dated 31 May 81
AD-A105 287
ABSTRACT: The [illegible] relationship between the
[illegible] the large coherent structures
[illegible] boundary layer was [illegible]
[illegible] of [illegible] and the [illegible] of
[illegible]
[illegible] of [illegible]
[illegible] controlled laboratory environment
[illegible] simultaneously [illegible]
[illegible] in the spanwise direction [illegible]
mode of interaction was observed. Measurements were
[illegible] on a flat plate at a representative Reynolds
number of [illegible] 000 and using two types of [illegible]
[illegible]. The data were [illegible] digitally and the
information gathered [illegible] used to assess the
statistical methods commonly employed in gathering
data in a boundary layer undergoing transition. It
is established that ensemble averaged velocities do
not represent the details of the flow adequately and
ensemble averaged turbulent intensities may be
physically deceiving. The interaction of spots
generated in succession from a single point source
provides a reasonable simulation of the turbulent
boundary layer. This mode of interaction inhibits
the growth of individual spots in the streamwise and
in the spanwise direction. As a result of this
interaction the largest excursions of the uv product,
representing the instantaneous shear stress occur
near the leading interface of each spot. (U)
DESCRIPTORS: *Turbulent flow, *Turbulent boundary
layer, *Boundary layer transition, Laminar boundary
layer, Reynolds number, Interfaces, Surges, W (U)
IDENTIFIERS: Shear flow, PE61102F, (U)
AD-A133 808

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AD-A133 807 12/1

FLORIDA STATE UNIV TALLAHASSEE

Recurrence of Symmetric Random Walks. (U)

DESCRIPTIVE NOTE: Annual rept.,
JUL 83 12P Dharmadhikari,S. W ;Joag-
Dev,Kumar ;
CONTRACT: F49620-82-K-0007
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0759

UNCLASSIFIED REPORT

ABSTRACT: In another document Shepp has used
certain definitions of unimodality and peakedness to
show that if F and G are symmetric unimodal and
F is less peaked than G, then the recurrence of
F implies the recurrence of G. This paper
extends Shepp's result to a wider class of
[illegible] (U)
[illegible] Symmetry,
[illegible] analysis, [illegible]
[illegible] (U)
[illegible] walk, [illegible]
[illegible] (U)

AD-A133 807

## DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A133 802        21/5        21/2        21/9.2

NAVAL WEAPONS CENTER CHINA LAKE CA

Turbulent Mixing and Combustion of Multi-
Phase Reacting Flows in Ramjet and Ducted
Rocket Environment.                                          (U)

DESCRIPTIVE NOTE: Final progress rept. 1 Apr 81-30 Sep
82.
    OCT 82      6P      Lee,M. J. ;Schadow,K. C.
;

CONTRACT: AFOSR-MIPR-82-00010
PROJ: 2308
TASK: A2
MONITOR: AFOSR  TR-83-0872

UNCLASSIFIED REPORT

ABSTRACT:     Experiments with gaseous fuels to
establish the base for the multiphase fuel tests were
completed for the axisymmetric-coaxial flow fields.
Radial and axial profiles of pressure, velocity,
species concentration and temperature were
determined. Agreement between measured values
(velocity and temperature) and computer predictions
was, in general, reasonably good. Experiments to
determine axial and radial temperature profiles with
boron particle laden fuels were started. (Author)    (U)
DESCRIPTORS: *Ramjet engines, *Ducted rockets,
Combustors, Multiphase flow, Combustion, Gas
generating systems, Jet mixing flow, Turbulent flow,
Reaction kinetics, Solid rocket propellants, Flow
visualization, Laser velocimeters, Doppler effect    (U)
IDENTIFIERS: Gas generating ramjets, PE61102F,       (U)
WUAFOSR2308A2

AD A133 802

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## DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD A133 806        21/2        14/2

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT
OF AEROSPACE AND OCEAN ENGINEERING

Injection, Atomization, Ignition and
Combustion of Liquid Fuels in High-Speed
Air Streams.                                                (U)

DESCRIPTIVE NOTE: Annual scientific rept. 1 Dec 81-31
Dec 82.
    JAN  83    19P      Schetz,Joseph A. ;

REPT. NO. VPI-AERO-131
CONTRACT: AFOSR-82-0159
PROJ: 2308
TASK: A2
MONITOR: AFOSR  TR-83-0864

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  See also Rept. no. VPI-AERO-130.
    AD-A125 237.
ABSTRACT.    A simulation approach to studying hot
flow subsonic cross-stream fuel injection problems in
a less complex and costly cold flow facility was
developed. A typical ramjet combustion chamber fuel
injection problem was posed where ambient temperature
fuel (kerosene) is injected into a hot airstream.
This case was transformed through two new
similarity parameters involving injection and
freestream properties to a simulated case where a
chilled injectant is injected into an ambient
temperature airstream. Experiments for the
simulated case using chilled Freon-12 injected into
the Va. Tech 23 x 23 cm. blow-down wind tunnel at
a freestream Mach number of 0.44 were run. The
freestream stagnation pressure and temperature were
held at 2.5 atm. and 300 degrees K respectively.
Results showed a clear picture of the mechanisms of
jet decomposition in the presence of rapid
vaporization. Immediately after injection a vapor
cloud was formed in the jet plume, which dissipated
downstream leaving droplets on the order of 8 to 10
microns in diameter for the conditions examined.
This represents a substantial reduction compared to
baseline tests run at the same conditions with water
which had little vaporization. The desirability of
using slurry fuels for aerospace application has long
been recognized, but the problems of slurry
combustion have delayed their use. The present work  (U)
DESCRIPTORS: *Jet flow, *Fuel injection.            (U)

AD-A133 806

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 777    7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

Superconductivity and Intralayer Structure in    (U)
Potassium Amalgam-GIC,

    83    8P    Timp,G. ;Elman,B. S. ;
Dresselhaus,M. S. ;Tedrow,P. ;
CONTRACT: F49620-83-C-0011, F49620-81-C-0006
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0753

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in MRS Symposium on
   Intercalated Graphite, p201 1983.
Reprint: Superconductivity and Intralayer Structure
in Potassium Amalgam-GIC.

DESCRIPTORS: *Graphite, *Potassium compounds,    (U)
*Transition temperature, *Superconductivity,
Structural properties, Lattice dynamics,
Electronic states, Microstructure, Critical
temperature, Reprints
IDENTIFIERS: GIC(Graphite Intercalation    (U)
Compounds), WUAFOSR2306C3, PE61102F

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 797    12/2    15/5

CITY COLL NEW YORK DEPT OF MATHEMATICS

On the Reliability of Systems Subject to    (U)
Maintenance and Repair.

DESCRIPTIVE NOTE: Final rept.,
  JUN    83    13P    Brown,Mark ;
CONTRACT: AFOSR-82-0024
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0820

UNCLASSIFIED REPORT

ABSTRACT:    This report documents progress achieved
during the period of the grant. Excellent bounds
were obtained for the goodness of exponential
approximation for the distribution of time to first
failure starting with all components functioning, as
reported in the paper, 'On the Reliability of
Repairable Systems'. The technical report,
'Exponential Approximations for Two Classes
of Aging Distributions' continues the principal
investigator's work into the topic of exponential
approximations. The paper derives inequalities and
monotonicity properties for stochastic processes
generated by failing items which are sometime, only
imperfectly repaired (in a sense defined in the
paper). As a by-product we obtain several new
results for proportional hazard families of
distributions. The problem of imperfect repair is
an important one with obvious practical
application.    (U)

DESCRIPTORS: *Operations research, *Maintenance,
*Repair, *Reliability, Mathematical prediction,
Exponential functions, Failure, Probability,
Variables, Statistical distributions    (U)
IDENTIFIERS: Imperfect repair, WUAFOSR2304A5,    (U)
PE61102F

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 769    20/4    12/1

FLOW RESEARCH CO KENT WA

Experimental Studies of Unsteady Phenomena in
Boundary Layers.    (U)

DESCRIPTIVE NOTE:  Annual technical rept. 1 May 82-30
Apr 83.
   MAY  83    60P    Gad-el-Hak,Mohamed ;
REPT. NO.  FRC-262
CONTRACT:  F49620-82-C-0020
PROJ: 2307
TASK: K1
MONITOR:  AFOSR  TR-83-0869

ABSTRACT:    The stability of decelerating boundary
layer flow is investigated experimentally and
numerically. Experimentally, a flat plate having a
Blasius boundary layer is decelerated in an 18-m
towing tank. The boundary layer becomes unstable to
two-dimensional waves which break down into three-
dimensional patterns, hairpin vortices, and finally
turbulent bursts when the vortices lift off the wall.
The unsteady boundary layer equations are solved
numerically to generate instantaneous velocity
profiles for a range of boundary and initial
conditions. A quasi-steady approximation is invoked
and the stability of local velocity profiles are
determined by solving the Orr-Sommerfeld equation
using Chebyshev matrix methods. Comparisons are
made between the numerical predictions and the
experimentally observed instabilities. (Author)
DESCRIPTORS:  *Boundary layer flow, *Unsteady flow,
*Deceleration, *Boundary layer transition, Flow
visualization, Equations, Problem solving,
Numerical methods and procedures
IDENTIFIERS:  ORR-Sommerfield equations,
PE61102F, WUAFOSR2307K1    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 772    14/5    9/2

HONEYWELL CORPORATE TECHNOLOGY CENTER BLOOMINGTON MN

E-Beam Written Computer Generated
Holograms.    (U)

DESCRIPTIVE NOTE:  Final technical rept. 1 Jan 80-28
Feb 83.
   AUG  83    87P    Arnold,Steven M.
REPT. NO.  E47069
CONTRACT:  F49620-80-C-0029
PROJ: 2305
TASK: B2
MONITOR:  AFOSR  TR-83-0850

ABSTRACT:    This final report describes a three-year
research program to investigate computer generated
holograms produced by electron beam lithography.
Because they are light weight and can create
wavefronts of arbitrary complexity, computer
generated holograms are attractive for applications
such as optical data processing and optical testing.
To be practical, these elements must have large
space bandwidth products, and have the qualities of
high diffraction efficiency, low scattering, low
aberration and low cost, as compared to conventional
optics. Developed have been generalized encoding
algorithms and fabrication techniques for producing
e-beam computer generated holograms having submicron
feature sizes, distortion-free resolution of better
than 0.4 micron, and space-bandwidth products in
excess of 10 to the 7th power. E-beam lithography
is superior to optical plotting for writing computer
generated holograms and, with further refinement,
could be extended to produce holograms having space-
bandwidth products as large as 10 to the 11th power,
comparing favorably with interferometrically recorded
holograms.    (U)
DESCRIPTORS:  *Holograms, *Computer applications,
*Lithography, Electron beams, Fabrication, Low
costs, Scattering, Distortion, Lightweight,
Wavefronts, Algorithms, Optics, Test methods,
Computer graphics, Computations    (U)
IDENTIFIERS:  E beam lithography, *Computer
generated holograms, PE61102F,
WUAFOSR2305B2    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 766    6/4    5/10

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

Untutored Concept Learning.    (U)

DESCRIPTIVE NOTE: Technical rept.,
    JUN 83    8P    DeJong,Gerald ;
CONTRACT: F49620-82-K-0009, NSF-IST81-20254
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-83-0771

UNCLASSIFIED REPORT

ABSTRACT:    This paper discusses explanatory schema
acquisition, a learning technique with several
interesting properties. It does not require a
teacher or concept matching predicate to be provided.
It does not rely on searching a concept space to
produce generalizations. It can acquire a new
concept based on only one input example, although
later inputs might result in refinement of learned
concepts. These features are made possible by
taking a very knowledge-based approach. The
concepts that are learned are problem-solving
schemata. Thus, the technique is not applicable to
all types of learning. However, it provides a
unique perspective on a large and interesting class
of learning. (Author)
DESCRIPTORS: *Artificial intelligence, *Problem
solving, *Learning, Input output processing,
Cognition, Comprehension, Computer applications,
Perception, Information processing, Input,
Acquisition, Reasoning, Recall, Memory devices,
Efficiency
IDENTIFIERS:    Explanatory schema acquisition,
Knowledge, Computer aided induction, Concepts,
PE61102F, WUAFOSR2304A2

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 767    7/3    7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

Magnetic Properties of Graphite Intercalation
Compounds.    (U)

    JUL    83    3P    Elahy,E. ;Shayegan,M. ;
Szeto,K.Y. ;Dresselhaus,G. ;
CONTRACT: F49620-83-C-0011
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0755

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Carbon Conference (16th)
p277, 18-22 Jul 83.
Reprint: Magnetic Properties of Graphite
Intercalation Compounds.

DESCRIPTORS: *Graphite, *Cobalt compounds,
*Magnetic properties, Chlorides, Temperature,
Models, Two dimensional, Reprints    (U)
IDENTIFIERS:  GIC(Graphite Intercalation    (U)
Compounds), PE61102F, WUAFOSR2306C3

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 762    20/11    14/2

LEHIGH UNIV BETHLEHEM PA INST OF FRACTURE AND SOLID MECHANICS

Mechanical Response of Materials with Physical Defects. Part 3. A Material Testing Program for Size and Rate Effects.    (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Jan 82-30 Mar 83,
    JUL 83,    49P    Sih,G. C. ;Matic,P. ;
REPT. NO. IFSM-83-117
CONTRACT: AFOSR-82-0194
PROJ: 2307
TASK: B2
MONITOR: AFOSR TR-83-0871

    UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 1 dated Oct 81. AD-A122 274.

ABSTRACT: A fundamental problem of structural analysis is the prediction of the final failure mode. Traditional approaches to the extreme forms of failure, i.e. plastic collapse and fracture instability, invoke a particular failure criterion to address one assumed failure mode. The appearance of the other mode is precluded by such an approach. A criterion is presented which addresses both macrocrack propagation and local changes in material properties using strain energy density. The damage state of the material at a particular instant of its load history is assumed to be governed by loading versus unloading behavior of the material's constitutive law. Macrocrack instability is assumed to occur when the size of the core region around the crack tip exceeds the predicted growth increment. This core region is defined by the closed contour of constant strain energy density equal to the maximum value addressed by the constitutive law. Crack growth increments occur in the direction of minimum strain energy density. The length of the crack growth increment is governed by the relative toughness of the material in the direction of propagation.    (U)

DESCRIPTORS: *Structural mechanics, *Defects(Materials), *Failure(Mechanics), Crack propagation, Fracture(Mechanics), Stres    (U)
IDENTIFIERS: WUAFOSR2307B2, PE61102F    (U)
    AD-A133 762

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 763    12/1    5/1

ARIZONA STATE UNIV TEMPE GROUP FOR COMPUTER STUDIES OF STRATEGIES

An Overview of the Quasi-Optimizer System.    (U)

DESCRIPTIVE NOTE: Technical rept.,
    JUL 83    19P    Findler,Nicholas V. ;
CONTRACT: AFOSR-82-0340
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-82-0464

    UNCLASSIFIED REPORT

DESCRIPTORS: *Mathematical models, *Statistical inference, Optimization, Organizations, Strategy, Reasoning, Variables, Decision making.    (U)
Artificial intelligence
IDENTIFIERS: Quasi optimizer system, PE61102F, WUAFOSR2304A2    (U)

AD-A133 763    UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVU43D

AD-A133 761    20/11    12/1

GEORGIA INST OF TECH ATLANTA SCHOOL OF ENGINEERING SCIENCE
AND MECHANICS

Analysis of the Nonlinear Large Deformation
Behavior of Composite Cylindrical Shells.    (U)

DESCRIPTIVE NOTE: Final rept. 30 Jun 81-30 Jun 83,
    83    88P    Simitses,George J. ;
Sheinman,Izhak ;Shaw,Dein ;
CONTRACT: AFOSR-81-0227
PROJ: 2307
TASK: B1
MONITOR: AFOSR TR-83-0870

UNCLASSIFIED REPORT

ABSTRACT:    The governing equations for the
nonlinear analysis of imperfect, stiffened,
laminated, circular, cylindrical, thin shells,
subjected to uniform axial compression and torsion,
and supported in various ways, are derived and
presented. Two types of formulations have been
developed; one (W,F-Formulation) is based
Donnell-type nonlinear kinematic relations; and the
other (u, v, w - formulation) is based on Sanders'
-type of nonlinear kinematic relations (small
strains, moderate rotations about in-plane axes). A
solution methodology is developed and presented.
Numerical results are generated for certain special
geometries, and these serve as bench marks for the
solution scheme. Parametric studies are performed
for composite cylinders. The scope of these studies
is to assess the effect of geometric imperfections
lamina stacking, and length of radius ratio. The
solution scheme is also tested by comparing
theoretical predictions (critical loads based on the
developed methodology) to experimentally obtained
results.    (U)

DESCRIPTORS:  *Shells(Structural forms),
*Structural mechanics, *Nonlinear analysis,
Cylindrical bodies, Loads(Forces), Deformation,
Composite structures, Mathematical analysis    (U)
IDENTIFIERS: PE61102F, WUAFOSR2307B1    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVU43D

AD-A133 760    12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

The Gauss-Tchebyshev Inequality for
Unimodal Distributions:.    (U)

DESCRIPTIVE NOTE: Annual rept.,
    JUN 83    16P    Dharmadhikari,S. W. ;Joag-
dev,Kumar ;
REPT. NO.    FSU-STATISTICS-M659, TR-83-157-AFOSR
CONTRACT: F49620-82-K-0007
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0770

UNCLASSIFIED REPORT

ABSTRACT:    Document describes The-Gauss-
Tchebyshev Inequality for Unimodal
Distributions. The determination of a value
improves and extends a recent result of
Vysochanskii and Petunin who have only considered
the case r = 2 with a higher value for k2. The
proof is also considerably simpler because it uses
the convex structure of the class of unimodal
distributions.    (U)
DESCRIPTORS: *Distribution functions, *Inequalities,
Markov processes, Random variables, Value,
Convex sets, Points(Mathematics)
IDENTIFIERS: Gauss tchebyshev inequality,
PE61102F, WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 742    3/2

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS

Very Large Array Observations of Solar
Active Regions. III. Multiple Wavelength
Observations.    (U)

APR 83    13P    Lang,Kenneth R. ;Willson,
Robert F. ;Gaizauskas,Victor ;
CONTRACT: AFOSR-83-0019
PROJ: 2311
TASK: A1
MONITOR: AFOSR TR-83-0844

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Astrophysical Jnl., v267
n1 pt 1 p455-464, 1 Apr 83.
Reprint: Ver) Large Array Observations of Solar
Active Regions. III. Multiple Wavelength
Observations.

DESCRIPTORS: *Solar radio maps, Radio
interferometry, Bremsstrahlung, Magnetic fields,
Sun, Emission, Photosphere, Comparison,
Reprints    (U)(U)
IDENTIFIERS: PE61102F, WUAFOSR2311A1

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 75:    3/2

LOUISIANA STATE UNIV BATON ROUGE OBSERVATORY

UBVRI Photometry of Stars Useful for Checking
Equipment Orientation Stability.    (U)

JUN 83    16P    Landolt,Arlo U. ;
REPT. NO. CONTRIB-178
CONTRACT: AFOSR-82-0192
PROJ: 2311
TASK: A1
MONITOR: AFOSR TR-83-0846

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Astronomical Jnl., v88 n6
p853-866 Jun 83.
Reprint: UBVRI Photometry of Stars Useful for
Checking Equipment Orientation Stability.

DESCRIPTORS: *Stars, Light, Colors, Photometry,
Reprints    (U)(U)
IDENTIFIERS: PE61102F, WUAFOSR2311A1

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 741    12/1

RENSSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

Numerical Methods for Singularly Perturbed Differential Equations with Applications.    (U)

DESCRIPTIVE NOTE: Interim scientific rept. 1 Jun 82-31 May 83.
    JUL 83    15P    Flaherty,Joseph E. ;
CONTRACT: AFOSR-80-0192
PROJ: 2304
TASK: A3
MONITOR: AFOSR TR-83-0810

UNCLASSIFIED REPORT

ABSTRACT:    During the period covered by this report the investigators continued their research on the development and application of numerical methods for singularly-perturbed (or stiff) boundary value problems for ordinary differential equations and initial-boundary value problems for partial differential equations. Results were obtained for collocation methods for vector systems of two-point boundary value problems and for adaptive grid finite element methods to several interesting physical problems, such as, the deformation of nonlinear elastic and plastic beams and a nonlinear Schrodinger equation which exhibits self focusing.    (U) (Author)
DESCRIPTORS: *Differential equations, *Perturbation theory, *Numerical methods and procedures, Stiffness. Boundary value problems. Vector analysis. Partial differential equations, Nonlinear systems, Abstracts, Rational functions, Vector analysis    (U)
IDENTIFIERS: Shrodinger equation, PE61102F, WUAFOSR2304A3    (U)

AD-A133 741

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 740    6/19

VIRGINIA MASON RESEARCH CENTER SEATTLE WA

Interaction of Anti-G Measures and Chest Wall Mechanics in Determining Gas Exchange    (U)

DESCRIPTIVE NOTE: Annual progress rept. 1 Apr 82-31 Mar 83.
    MAY 83    40P    Modell,Harold I. ;
CONTRACT: F49620-81-C-0055
PROJ: 2312
TASK: A1
MONITOR: AFOSR TR-83-0808

UNCLASSIFIED REPORT

ABSTRACT:    Efforts during this reporting period have been directed in three areas: (1) Examination of regional intrapleural pressure changes during +Gz stress in the pig; (2) Development of an inexpensive assist/control, volume limited animal ventilator; and (3) Determining the influence of chest wall motion on gas exchange during mechanical ventilation in dogs. Studies assessing regional intrapleural pressure changes during +Gz stress in the dog were repeated in similar sized pigs to determine the role of chest wall mechanics in determining these changes. When the G-suit abdominal bladder was used, increases in regional intrapleural pressure greater than those seen in analogous dog experiments were observed. These results imply that, as the chest wall becomes less compliant, the degree of lung compression attributable to +Gz stress without G-suit application should deminish. In another series of experiments, gas exchange during assisted and controlled ventilation were compared in an attempt to ascertain whether an active effort by chest wall muscles coordinated with inspiration can influence gas exchange. The data obtained indicate that an inspiratory muscular effort enhances gas exchange. Measured gas exchange parameters suggest that this enhancement is the result of a redistribution of perfusion rather than a redistribution of ventilation.    (U)
DESCRIPTORS: *Stress(Physiology), *Gas exchange(Biology), Lung, Swine, Dogs, Thorax, Motion, Pressure, G suits, Parameters, Muscles, Control, Volume    (U)
IDENTIFIERS: PE61102F, WUAFOSR2312A1    (U)
    AD-A133 740

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 726    12/1

WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

Annual Report, Air Force Grant AFOSR-82-0275.    (U)

DESCRIPTIVE NOTE: Interim rept. 15 Jun 82-14 Jun 83,
JUN 83    9P    Parter,Seymour V. ;
CONTRACT: AFOSR-82-0275
PROJ: 2304
TASK: A3
MONITOR: AFOSR TR-83-0824

UNCLASSIFIED REPORT

ABSTRACT: The original proposal to AFOSR suggested that the major emphasis of this research would be on Solving Elliptic-Parabolic Problems. Three topics of special interest follow. (1) The extension of the basic theory (originally developed for finite-difference equations) of professor Parter and his co-workers to those algebraic systems which arise in the finite-element approach to elliptic and parabolic problems. (2) The study of multi-grid methods. (3) A continuing experimental/analytical study of special splittings in the generalized conjugate gradient methods for elliptic and parabolic problems. (Author)    (U)

DESCRIPTORS: *Finite element analysis, *Iterations, *Finite difference theory, Air Force research, Ellipses, Parabolas, Eigenvalues, Splitting, Grids, Gradients    (U)
IDENTIFIERS: WUAFOSR2304A3, PE61102F    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 729    21/5    20/12

MASSACHUSETTS INST OF TECH CAMBRIDGE

Optically Pumped cw Semiconductor Ring Laser.    (U)

JUL 83    5P    Fuchs,A. ;Bebelaar,D. ;
Salour,M.M. ;
CONTRACT: F49620-79-C-0071
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-83-0814

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applied Physics Letters. v43 n1 p32-34, 1 Jul 83.
Reprint: Optically Pumped cw Semiconductor Ring Laser.

DESCRIPTORS: *Semiconductor lasers, *Optical pumping, *Ring lasers, Cadmium sulfides, Laser pumping, Argon lasers, Rings, Configurations, Continuous waves, Reprints    (U)
IDENTIFIERS: PE61102F, WUAFOSR2306C2    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 724    12/1    20/9

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF
MATHEMATICS

Electric Microfield Distributions in Strongly    (U)
Coupled Plasmas.

   SEP 83    7P    Iglesias,Carlos A. ;
Lebowitz,Joel L.;MacGowan,David ;
CONTRACT: AFOSR-82-0016
PROJ: 2301
TASK: A8
MONITOR: AFOSR TR-83-0837

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical review A, v28
n3 p1667-1672 Sep 83.
Reprint: Electric Microfield Distributions in
Strongly Coupled Plasmas.

DESCRIPTORS: *Numerical methods and procedures,
*Electric fields, *Computations,
*Plasmas(Physics), Coupling(Interaction),    (U)
Fourier transformation, Distribution, Computerized
simulation, Reprints
IDENTIFIERS: Electrical microfields.    (U)
WUAFOSR2301A8, PE61102F

AD-A133 724

PAGE    50

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD A133 725    7/4

WISCONSIN UNIV-MADISON DEPT OF PHYSICS

Model of Optogalvanic Effects in the Neon    (U)
Positive Column.

   AUG 83    10P    Doughty,D. K. ;Lawler,J.
E. ;
CONTRACT: AFOSR-81-0208
PROJ: 2301
TASK: A7
MONITOR: AFOSR TR-83-0813

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v28
n2 p773-780 Aug 83.
Reprint: Model of Optogalvanic Effects in the Neon
Positive Column.

DESCRIPTORS: *Neon, *Gas discharges, *Electrical
properties, Model theory, Perturbation theory,    (U)
Atomic energy levels, Reprints
IDENTIFIERS: Optogalvanic effects.    (U)
WUAFOSR2301A7, PE61102F

AD A133 725    UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 691    12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

Total Positivity. A Review.    (U)

DESCRIPTIVE NOTE: Technical rept.,
    JUL 83    18P    Kim,Jee Soo ;Proschan,
    Frank ;
REPT. NO.   FSU-STATISTICS-M663, TR-83-159-AFOSR
CONTRACT:   F49620-82-K-0007
PROJ:   2304
TASK:   A5
MONITOR:    AFOSR TR-83-0822

UNCLASSIFIED REPORT

ABSTRACT:    This paper is an invited entry for the
Encyclopedia of Statistical Sciences published
by John Wiley and Sons. The main objective is
to review the concepts of total positivity, which
plays an important role in various domains of
mathematics and statistics. This article describes
the power and scope of total positivity, and samples
the great variety of fields of its application. The
theory of total positivity has been extensively
applied in several domains of mathematics,
statistics, economics, and mechanics. In
statistics, totally positive functions are
fundamental in permitting characterizations of best
statistical procedures for decision problems. The
scope and power of this concept extend to
ascertaining optimal policy for inventory and system
supply problems, to clarifying the structure of
stochastic processes with continuous path functions,
to evaluating the reliability of coherent systems,
and to understanding notions of statistical
dependency.    (U)
DESCRIPTORS:   *Functions(Mathematics), *Statistical
processes, Statistical decision theory, Probability
density functions, Set theory, Stochastic processes,
Inventory, Reliability, Life tests
IDENTIFIERS:   Total positivity theory, PE61102F,
WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

1D-A133 694    5/10

CALIFORNIA UNIV LOS ANGELES MENTAL RETARDATION RESEARCH
CENTER

Neuronal Adaptive Mechanisms Underlying
Intelligent Information Processing.    (U)

DESCRIPTIVE NOTE: Final rept.,
    MAY 83    82P    Woody,Charles D. ;
CONTRACT:   AFOSR-81-0179
PROJ:   2312
TASK:   A1
MONITOR:    AFOSR TR-83-0834

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:   See also report dated 1 May 82,
AD-A119 224.
ABSTRACT:    Acceleration of the rate of learning of
a conditioned facial movement was accomplished by
adding electrical stimulation of the hypothalamic
region of the brain to presentations of conventional
conditioned and unconditioned stimuli, confirming
earlier Soviet observations of a comparable effect
by such simulation. The learning that resulted was
both associative and discriminative. That is,
learning was induced by a specific stimulus
combination, the code depending on the order and
interval of presentations of two different stimuli.
The learned response was then elicitable by a
specific stimulus combination, the code depending on
the order and specific input signal. Research
indicates that the pattern of cortical neuronal
activity produced by hypothalamic stimulation
predicts loci of hypothalamic stimulation that, when
stimulated, will succeed in accelerating learning.
Present studies are directed toward establishment
of whether the hypothalamic stimulation responsible
for acceleration of learning is punishing or
rewarding. This may, however, be of less
consequence in understanding what is going on than
would specifying the coded molecular interactions
that occur between the chemical(s) released by
hypothalamic stimulation and other chemicals capable
of modifying the transfer properties of the nerve
cell. It is these interactions that are thought to
be primary in controlling the potentiation of
learning. (Author)    (U)
    (U)
DESCRIPTORS:   *Behavioral science, *Learning,
*Brain, *Electrophysiology, Hypothalamus, Nerve
    AD-A133 694

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 659    20/1    20/2    17/1    9/1

UNITED TECHNOLOGIES CORP HARTFORD CT

Research and Development of Subsurface Acoustic Wave Device Configurations for Sensor Applications.    (U)

DESCRIPTIVE NOTE: Final rept. 15 Jul 82-12 Sep 83,
SEP 83    76P    Cullen,Donald E. ;Meltz,
Gerald ;Grudkowski,Thomas W. ;
REPT.NO.: UTRC-R83-926157
CONTRACT: F49620-82-C-0074
PROJ: 2305
TASK: B2
MONITOR: AFOSR TR-83-0825

UNCLASSIFIED REPORT

ABSTRACT:    Subsurface,acoustic wave modes that are sensitive to substrate strain but insensitive to temperature and surface fluid loading were sought for sensor applications. The properties of Stoneley-like interface waves in the layered structure $SiO_2/LiNbO_3$ were examined. A horizontal-shear surface wave in the same material configuration was found to be insensitive to surface fluids and was further studied for sensor applications. Zero first order temperature coefficients were found for these modes by varying the $SiO_2$ film thickness. Surface skimming bulk waves in quartz were also examined and found to possess the most attractive properties for continued work in acoustic wave sensor development. (Author)
DESCRIPTORS: *Acoustic waves, Substrates, Interfaces, Subsurface, Strain(Mechanics), Wave propagation, Quartz, Crystal structure, Electroacoustic transducers, Silicon dioxide, Lithium niobates, Temperature coefficients, Sensitivity, Surface acoustic waves, Surface waves, Acoustic detectors, Accelerometers
IDENTIFIERS: *SSAW(Subsurface Acoustic Waves), Stoneley wavs, Subsurface acoustic wave devices, SSBW(Surface Skimming Bulk Waves), Acoustic wave modes, Shear waves, Polarization, WUAFOSR2305B2, PE61102F    (U)

AD-A133 659

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UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 668    3/2

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS

The Circularly Polarized Sun at 12.6 cm Wavelength.    (U)

DESCRIPTIVE NOTE: Interim rept.,
JUN 83    15P    Lang,Kenneth R. ;Willson,
Robert F. ;
CONTRACT: AFOSR-83-0019
PROJ: 2311
TASK: A1
MONITOR: AFOSR TR-83-0848

UNCLASSIFIED REPORT

ABSTRACT:    Circular polarization maps of the Sun with 45 sec angular resolution at 12 cm wavelength are presented for six continuous days. The maps have degrees of circular polarization up to pc = 20%, and they show an excellent correlation with photostatic magnetograms. A similar correlation exists at 6 cm and 20 cm, and at all three wavelengths the brightness temperatures, TB, of the circularly polarized emission is TB approx 1,000,000 K. This suggests that the emission at all three wavelengths is due to the same hot plasma radiating in the presence of magnetic fields that project radially upwards from the photosphere into the low solar corona. At 6 cm wavelength highly circularly polarized (pc appprox 50%), core sources with angular sizes 0 approx 10 sec to 30 sec occur near sunspots. These core sources are due to gyroresonant emission at the third harmonic of the gyrofrequency, implying longitudinal magnetic field strengths of H1 approx 580 spots, gauss at altitudes h approx 3 x 10 to the ninth power cm above the sunspots. In regions near sunspots, the circularly polarized emission at 6 cm, 12 cm and 20 cm could all be due to the gyroemission of hot electrons spiralling in magnetic fields of strength H1 approx 280 gauss and H1 approc 170 guass are inferred from the 12 cm and 20 cm data, respectively. An alternative explanation is polarization by bremsstrahlung propagating in magnetic fields of strength H1 approx 100 guass and 50 gauss, respectively.    (U)
DESCRIPTORS: *Solar activity, *Maps, Polarization, Photosphere, Sunspots, Solar radio maps, Sola    (U)
IDENTIFIERS: Circular polarization, PE61102F,    (U)
AD-A133 668

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A133 656    7/4    4/1

COLLEGE OF THE HOLY CROSS WORCESTER MA DEPT OF CHEMISTRY

A Molecular Orbital Study of Atmospherically Important Species.    (U)

DESCRIPTIVE NOTE: Final rept. 15 Jun 82-14 Jun 83,
JUN 83    39P    Deakyne,Carol A. ;
CONTRACT: AFOSR-82-0198
PROJ: 2303
TASK: D9
MONITOR: AFOSR TR-83-0803

UNCLASSIFIED REPORT

ABSTRACT:    One objective of this work was to use ab initio molecular orbital (MO) theory to determine the optimum structure of OH(-)-HNO3 and to compute its adiabatic electron affinity, bond dissociation energy and charge distribution. Thus, a study of OH(-)-HNO3 and a series of simpler molecules and ions, which contain similar types of bonds and whose structures and adiabatic electron affinities are known, was carried out to find the most economical basis set which yields reliable results. The other molecules and ions considered were OH, OH(-), NH, NH(-), NH2, NH2(-), OOH, OOH(-), NO2, NO2(-), H2O, OH(-)-H2O, HNO3, and HNO3(-). A second objective of this work was to probe the accuracy of the various basis sets in calculating energy changes for reactions involving negative ions. The results indicated that once the HNO3(-) was formed it broke down via electron detachment of dissociation into NO2- and OH around interaction energies of 0.8eV. The dissociation of HNO3(-) into OH(-) and NO2 was concluded to be a less likely loss process.    (U)

DESCRIPTORS:  *Molecular orbitals, *Molecules,
*Ions, *Atmospheric chemistry, Hydroxyl radicals,
Nitric acid, Molecular structure, Chemical bonds,
Chemical dissociation, Energy, Electron transfer,
Adiabatic conditions, Reaction kinetics,
Polarization, Diffusion, Functions,
Thermodynamic properties, Dipole moments,
Hydrogen, Nitrogen, Nitrogen oxides    (U)
IDENTIFIERS: WUAFOSR2303D9, PE61102F    (U)

AD-A133 656

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A133 657    12/1

BOEING COMPUTER SERVICES CO TUKWILA WA ENERGY TECHNOLOGY APPLICATIONS DIV

Ordering Methods for Sparse Matrices.    (U)

DESCRIPTIVE NOTE: Rept. no. 2 (Final) Jul 81-Jul 83,
JUL 83    9P    Lewis,John G. ;
CONTRACT: F49620-81-C-0072
PROJ: 2304
TASK: A3
MONITOR: AFOSR TR-83-0819

UNCLASSIFIED REPORT

ABSTRACT:    This document describes the performance of five tasks: creation of a comprehensive test matrix collection, analysis of the Hellerman-Rarick P4 algorithm, production of a P4 code, production of a diagnostic code, and comparative analysis of several algorithms using the test matrices and the diagnostic code. Reports on the completion of the five tasks are given, relevant reports and publications of project personnel are listed and related sparse matrix activities are discussed.    (U)

DESCRIPTORS: *Sparse matrix, Computations, Linear
algebraic equations Numerical methods and procedures,
Test methods, Coding, Fortran, Bibliographies,
Research management    (U)
IDENTIFIERS: Hellerman Rarick algorithm,
WUAFOSR2304A3, PE61102F    (U)

AD-A133 657

AD-A133 636   12/1   8/16   5/2

HARVARD MEDICAL SCHOOL BOSTON MA

Symposium on Mathematical Modeling of Circadian Systems.   (U)

DESCRIPTIVE NOTE: Final scientific rept. 1 May 81-30 Apr 82,
MAY 82   31P   Moore-Ede,Martin C. ;
CONTRACT: AFOSR-81-0133
PROJ: 2312
TASK: A1
MONITOR: AFOSR TR-83-0851

UNCLASSIFIED REPORT

ABSTRACT:   This is the Final Scientific Report on a Satellite Symposium on the mathematical modeling of circadian systems which was held on June 21, 1981 in conjunction with the Annual Meeting of the Association for the Psychophysiological Study of Sleep in Cape Cod, Massachusetts. The purpose of the satellite symposium was to present and critically review recently developed mathematical models of the circadian timing system, with particular emphasis on human sleep-wake organization, as designed by various investigators from both the United States and abroad who would be invited to participate.   (U)

DESCRIPTORS: *Mathematical models, *Circadian rhythms, *Symposia, Sleep, Psychophysiology, Wake, State of the art, Damping, Oscillators, Excitation, Animals, Humans, Stochastic processes   (U)
IDENTIFIERS:   PE61102F, WUAFOSR2312A1   (U)

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AD-A133 654   12/1

CALIFORNIA UNIV SANTA BARBARA INST FOR THE INTERDISCIPLINARY APPLICATIONS OF ALGEBRA AND COMBINATORICS

Stability Analysis for Difference Schemes, Problems in Applied Linear Algebra, and Application of Number Theory to Computing.   (U)

DESCRIPTIVE NOTE: Final scientific rept. 1 Oct 79-30 Apr 83,
JUL 83   42P   Goldberg,Moshe ;Marcus, Marvin ;Minc,Henryk ;Newman,Morris ;Thompson, Robert C. ;
CONTRACT: AFOSR-79-0127
PROJ: 2304, 9749
TASK: A3, 03
MONITOR: AFOSR TR-83-0823

UNCLASSIFIED REPORT

ABSTRACT:   Document describes research consisting mainly of the following topics: (1) Convenient stability criteria for finite difference approximations to hyperbolic initial-boundary value problems: theory and applications. (2) Operator norms, matrix norms, and multiplicativity. (3) Generalizations of the Perron-Frobenius Theorem and localization of eigenvalues with maximal absolute value.   (U)

DESCRIPTORS: *Finite difference theory, *Stability, Partial differential equations, Approximation(Mathematics), Air Force research.   (U)
Boundary value problems, Linear algebra, Eigenvalues. Number theory, Computations   (U)
IDENTIFIERS: Hyperbolic differential equations, WUAFOSR974903, WUAFOSR2304A3, PE61102F

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 597    6/16    5/10    5/9    20/6

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

Optical Flow and Texture Variables Useful in Simulating Self Motion (II).                    (U)

DESCRIPTIVE NOTE:  Final technical rept. 1 Feb 82-31 Mar 83.
    JUN 83,   143P    Owen,Dean H. ;
CONTRACT:  AFOSR-81-0078
PROJ:  2313
TASK:  A5
MONITOR:  AFOSR  TR-83-0807

UNCLASSIFIED REPORT

ABSTRACT:    This report outlines a program of research applying ecological optics to the study of visual information useful for detecting and guiding self motion during flight. Techniques are presented for isolating optical sources of information by controlling simulated flight path and speed variables in conjunction with ground surface texture variables. Problems encountered in the design of experiments using higher-order ratios exhibiting constrained linkages are discussed, and several solutions are suggested. A case is made for the necessity of considering the entire perception-(control) action cycle in the study of self-motion sensitivity, and implications of ecological optics experiments for the understanding of 'smart' information-specifying visual system mechanisms are discussed. Three experiments are presented testing the usefulness of optical variables and invariants for detecting changes in speed and altitude. Our findings to date provide a basis for the development of tests to evaluate candidates for flight training, the simulators with which pilots are trained, and improvement in sensitivity with training. In addition, our approach provides a sound empirical foundation from which to begin interactive experiments in which pilots control, rather than simply react to, the variables and invariants of optical stimulation.                    (U)

DESCRIPTORS:  *Space perception, *Motion, *Flight simulation, *Optics, Visual perception, Judgement(Psychology), Optical properties, Flow, Texture, Flight maneuvers, Performance(Human), Control, Pilots, Aircraft landings, Variables
IDENTIFIERS:  LPN-OSURF-762550/713531,                    (U)
                                              (U)
                    AD-A133 597

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 598    11/6    20/11

CINCINNATI UNIV OH DEPT OF MATERIALS SCIENCE AND METALLURGICAL ENGINEERING

Elevated Temperature Low Cycle Fatigue of Nickel Base Superalloys in the Conventionally Cast, Directionally Solidified and Single Crystal Forms.                    (U)

DESCRIPTIVE NOTE:  Final rept. 1 Jan 80-30 Jun 83.
    AUG 83    61P    Antolovich,Stephen D. ;
CONTRACT:  AFOSR-80-0065
PROJ:  2306
TASK:  A1
MONITOR:  AFOSR  TR-83-0827

UNCLASSIFIED REPORT

ABSTRACT:    High temperature low cycle fatigue (LCF) has been studied for directionally solidified (DS) and conventionally cast (CC) Rene' 80. For the conventionally cast material testing was carried out on smooth bars over the temperature range 75 F (24 C) to 1800 F (982 C). It was found that at low temperatures slip was planar and carbides acted as crack initiation sites. In correspondence with the importance of carbides on the fatigue life it was found that life cosrrelated best with total strain range (as opposed to plastic strain range).                    (U)

DESCRIPTORS:  *Superalloys, *Nickel alloy inconel, *Fatigue(Mechanics), *Cyclic tests, High temperature, Microstructure, Single crystals, Solidification, Modulus of elasticity, Strain(Mechanics), Degradation, Casting, Carbides, Morphology, Fatigue life, Electron microscopy, Interactions, Dislocations, Crack propagation, Strength(Mechanics), Plastic properties, Ductility, Brittleness, Trade off analysis
IDENTIFIERS:  Low cycle fatigue, WUAFOSR2306A1, PE61102F

AD-A133 598

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 462    20/9    20/7

OLD DOMINION UNIV NORFOLK VA DEPT OF ELECTRICAL
ENGINEERING

An Investigation of Accelerating Mechanisms
in a Plasma Focus Relevant to Interrupting
Switches.                                                  (U)

DESCRIPTIVE NOTE: Rept. no. 1 (Final), 1 Nov 80-31
     Jan 83,
     JUL 83    113P     Pronko,Mark S. ;Molen,G.
     Marshall ;
CONTRACT: AFOSR-81-0039
PROJ: 2301
TASK: A7
MONITOR: AFOSR TR-83-0794

UNCLASSIFIED REPORT

ABSTRACT:     An experimental investigation was
conducted using a 34-kJ Dense Plasma Focus
(DPF) in which the possible enhancement of the
electron beam was addressed. Electron beams ejected
from the DPF have been observed to exceed 30 kA
with pulse durations of a few nanoseconds.
Enhancement was considered to be either an increase
in the probability that the peak beam current
exceeded some lower limit, or an increase in the mean
energy of the beam electrons. The investigation was
divided into two parts, each addressing one of the
aspects of enhancement.                                    (U)
DESCRIPTORS: *Plasma accelerators, *Particle
accelerators, *Electron beams, *Output, High
energy, Charged particles, Energy conversion,
Pinch effect, Experimental data, Electrodes,
Pulse rate, Electromagnetic induction, Energy
storage                                                    (U)
IDENTIFIERS: Dense plasma focus, Interrupting
switches, *Electron beam enhancement, Electron
beam propagation, PE61102F, WUAFOSR2301A7                  (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 463    20/4

PRINCETON UNIV NJ DEPT OF MECHANICAL AND AEROSPACE
ENGINEERING

Development of a Turbulence Closure Model for
Geophysical Fluid Problems,                                (U)

     NOV 82    27P     Mellor,George L. ;Yamada,
     Tetsuji ;
CONTRACT: AFOSR-79-0118
PROJ: 2307
TASK: A2
MONITOR: AFOSR TR-83-0736

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Reviews of Geophysics and
     Space Physics, v20 n4 p851-875 Nov 82.
     Reprint: Development of a Turbulence Closure Model
     for Geophysical Fluid Problems.

DESCRIPTORS: *Turbulent flow, Fluid dynamics,
Closures, Stratification, Geophysics,
Reprints                                                   (U)
IDENTIFIERS: PE61102F, WUAFOSR2307A2                       (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 346    7/4

NATIONAL BUREAU OF STANDARDS WASHINGTON DC MOLECULAR
SPECTROSCOPY DIV

The Dispersion Damping Functions and    (U)
Interaction Energy Curves for Xe-Xe.

DESCRIPTIVE NOTE: Technical rept.
    MAY 80    4P    Krauss,M. ;Stevens,W. J. ;
    Neumann,D. B. ;
CONTRACT: A-DSR-ISSA-82-0017
PROJ: 2301
TASK: A4
MONITOR: AFOSR TR-83-0786

    UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics
    Letters, v71 n3 p500-502, 1 May 80.
Reprint:The Dispersion Damping Functions and
Interaction Energy Curves for Xe-Xe.

DESCRIPTORS: *Xenon, *Ground state, *Potential    (U)
energy, Energy levels, Hartree Fock approximation.    (U)
Distribution curves, Damping, Reprints
IDENTIFIERS: PE61102F, WUAFOSR2

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 345    7/4

NATIONAL BUREAU OF STANDARDS WASHINGTON DC MOLECULAR
SPECTROSCOPY DIV

Ab initio Effective Spin-Orbit Operators    (U)
for Use in Atomic and Molecular Structure
Calculations Results for CH, OH, SiH,
CO+, CO, and SiO.

DESCRIPTIVE NOTE: Technical rept.,
    APR 82    4P    Stevens,Walter J. ;Krauss,
    Morris ;
CONTRACT: AFOSR-ISSA-82-0017
PROJ: 2301
TASK: A4
MONITOR: AFOSR TR-83-0787

    UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical
    Physics, v76 n7 p3834-3836, 1 Apr 82.
Reprint: Ab Initio Effective Spin-Orbit
Operators for Use in Atomic and Molecular
Structure Calculations. Results for CH, OH,
SiH, CO, CO, and SiO.

DESCRIPTORS: *Spin states, *Atomic structure,
*Molecular structure, Atomic orbitals, Energy
levels, Mathematical analysis, Reprints
IDENTIFIERS: AESOP(Atomic Ab initio Effective
Spin-Orbit Operators), PE61102F,
WUAFOSR2301A4

AD-A133 344    7/4

NATIONAL BUREAU OF STANDARDS WASHINGTON DC MOLECULAR SPECTROSCOPY DIV

Interaction Energy for Open-Shell Systems.    (U)

DESCRIPTIVE NOTE: Technical rept.,
  JUL 81  6P  Neumann,D. B. ;Krauss,M. ;
CONTRACT  AFOSR-ISSA-82-0017
PROJ: 2301
TASK: A4
MONITOR: AFOSR TR-83-0788

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v75 n1 p315-319, 1 Jul 81. Reprint: Interaction Energy for Open-Shell Systems.

DESCRIPTORS: *Atomic energy levels, *Potential energy, *Ground state, Hartree Fock approximation, Damping, Nuclear shell models, Coupling(Interaction), Reprints    (U)(U)
IDENTIFIERS: PE61102F, WUAFOSR2301A4

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AD-A133 334    20/5    20/6

CALIFORNIA UNIV SANTA BARBARA QUANTUM INST

Theory of Pulse Propagation and Coherence in Free Electron Lasers.    (U)

DESCRIPTIVE NOTE: Final scientific rept. 2 Dec 81-30 Nov 82,
  NOV  82  7P  Colson,W. B. ;
CONTRACT: AFOSR-81-0061
PROJ: 2301
TASK: A1
MONITOR: AFOSR TR-83-0783

UNCLASSIFIED REPORT

ABSTRACT:    A review was made of various pulse propagation theories and comparison to the Stanford experiment. Quantum noise effects were theoretically derived for free electron lasers in optical resonators and found to be small. Control of the synchrontron instability with selective mirrors was examined. A comprehensive Lagrangian description of the gain surfaces for various free electron laser designs was made. A theory was developed for the electron dynamics and optical wavefronts in Gaussian resonators.    (Author)
DESCRIPTORS: *Electrical lasers, *Free electrons, *Pulses, Lagrangian functions, Propagation, Coherence, Mirrors, Noise(Electrical and Electromagnetic), Quantum electronics, Optical properties, Resonators, Electrodynamics, Wavefronts    (U)
IDENTIFIERS: *Free electron lasers, Optical pulses, Pulse propagation, Laser coherence, PE61102F, WUAFOSR2301A1    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 313    18/3    8/11

RONDOUT ASSOCIATES INC STONE RIDGE NY

Test Ban Treaty Verification with Regional
Data - A Review,    (U)

DEC 82    43P    Pomeroy,Paul W. ;Best,
William J. ;McEvilly,Thomas V. ;
CONTRACT: F49620-80-C-0021
PROJ: 2309
TASK: A1
MONITOR: AFOSR  TR-83-0791

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Pub. in Bulletin of the
Seismological Society of America, v72 n6 pS89-
S129 Dec 82.
Reprint: Test Ban Treaty Verification with
Regional Data - A Review.

DESCRIPTORS:  *Nuclear explosion detection, *Seismic
data, Underground explosions, Global, Seismic
waves, Wave propagation, Position(Location),
Reprints
IDENTIFIERS:  PE61101E, WUAFOSR2309A1    (U)
    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 314    20/12

MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS
SCIENCE AND ENGINEERING

Temperature Dependence of C-Axis Electrical
Resistivity and Thermopower of Graphite
Intercalation Compounds,    (U)

82    4P    Issi,J-P. ;Poulaert,B. ;
Heremans,J. ;Dresselhaus,M. S. ;
CONTRACT: F49620-83-C-0011
PROJ: 2306
TASK: C3
MONITOR: AFOSR  TR-83-0750

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Pub. in Solid State
Communications, v44 n4 p449-451 1982.
Reprint: Temperature Dependence of C-Axis
Electrical Resistivity and Thermopower of Graphite
Intercalation Compounds.

DESCRIPTORS:  *Graphite, *Electrical properties,
*Temperature, Electrical resistance,
Thermoelectric power generation, Potassium, Iron
compounds, Reprints    (U)
IDENTIFIERS:  *Graphite intercalation compounds,
PE61102F, WUAFOSR2306C3    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 310    20/7    15/3

MISSION RESEARCH CORP ALBUQUERQUE NM

Beam Propagation Experimental Study.    (U)

DESCRIPTIVE NOTE: Final rept.,
    APR 83    295P    Adler,R. J.;Kiuttu,G.
F. ;Sabol,B. A. ;Bostick,W. ;Ekdahl,C. A.

REPT. NO.    AMRC-R-466
CONTRACT: F49620-81-C-0016
PROJ: 2301
TASK:    A7
MONITOR: AFOSR TR-83-0743

UNCLASSIFIED REPORT

Availability: Document partially illegible.
SUPPLEMENTARY NOTE: See also Rept. no. AMRC-N-167.
    AD-A108 504.
ABSTRACT:    A program of extensively diagnosed
experiments to investigate the physics of intense
relativistic electron beam propagation in air has
been performed using beam generators at the Air
Force Weapons Laboratory. The primary
objectives of his research were to measure the rate
of erosion of the head of the beam, and to
investigate resistive instabilities, such as the hose
and hollowing modes, that limit the transport of beam
energy over significant distances.    (U)

DESCRIPTORS: *Particle beams, *Propagation,
*Diagnosis(General), *Weapons, Experimental
data. Erosion. Generators, Hoses,
Plasmas(Physics). Conductivity, Electron energy,
Electron transport. Range(Distance),
Measurement. Noses. Computerized simulation    (U)
IDENTIFIERS: Beam propagation    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 294    7/4

NATIONAL BUREAU OF STANDARDS WASHINGTON DC MOLECULAR
SPECTROSCOPY DIV

Ab Initio Determination of the Ground State
Potential Energy Curve for Ar2.    (U)

    JAN 82    6P    Krauss,M. ;Stevens,W. J. ;
CONTRACT: AFOSR-ISSA-82-0017
PROJ: 2301
TASK:    A4
MONITOR: AFOSR TR-83-0789

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:    Pub. in Chemical Physics
Letters. v85 n4 p423-427, 22 Jan 82.
Reprint: Ab Initio Determination of the Ground
State Potential Energy Curve for Ar2.

DESCRIPTORS: *Argon, *Ground state, *Potential
energy, Distribution curves, Dispersion relations.
Reprints    (U)
IDENTIFIERS: WUAFOSR2301A4, PE61102F    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 292    20/4

SAN DIEGO STATE UNIV CA DEPT OF AEROSPACE ENGINEERING AND ENGINEERING MECHANICS

New Developments in Open Separation.    (U)

82    14P    Wang,K. C. ;

CONTRACT: AFOSR-81-0109
PROJ: 2307
TASK: A1
MONITOR: AFOSR TR-83-0739

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the IUTAM Symposium, 94-105, 29 Mar-1 Apr 82. Reprint: New Developments in Open Separation.

DESCRIPTORS: *Flow separation, Three dimensional flow, Flow fields, Boundary layer flow, Reprint    (U)
IDENTIFIERS: Open separation, WUAFOSR2307A1, PE61102F    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 293    20/12    7/4

NORTHWESTERN UNIV EVANSTON IL DEPT OF PHYSICS

Fermi Surfaces of Acceptor Intercalated Compounds: Evidence from AsF5-Graphite.    (U)

83    7P    Markiewicz,R. S. ;Lopatin, C. ;Zahopoulos,C. ;

CONTRACT: F49620-82-C-0076
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0793

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Mat. Res. Soc. Symp. Proc.; v20 p135-140 1983. Reprint: Fermi Surfaces of Acceptor Intercalated Compounds: Evidence from AsF5-Graphite.

DESCRIPTORS: *Graphite, *Fermi surfaces, *Charge transfer, Arsenic compounds, Fluorides, Electron acceptors, Charge carriers, Oscillation, Reprints    (U)
IDENTIFIERS: Intercalated graphite, WUAFOSR2306C3, PE61102F Magnetooscillation, WUAFOSR2306C3, PE61102F    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 275    20/5    20/7

MATHEMATICAL SCIENCES NORTHWEST INC BELLEVUE WA

Mode Structure of a Tapered-Wiggler Free-Electron Laser Stable Oscillator.    (U)

MAY 83    13P    Quimby,David C. ;Slater, Jack ;
CONTRACT: F49620-81-C-0079
PROJ: 2301
TASK: A1
MONITOR: AFOSR TR-83-0795

UNCLASSIFIED REPORT

DESCRIPTORS: *Electrical lasers, *Free electrons. *Electron beams, Focusing, Laser cavities, Photons, Magnetic fields, Stability, Mirrors, Deceleration, Gain, Oscillators, Reprints    (U)
IDENTIFIERS: Tapered wigglers, FEL(Free Electron Lasers), Mode structures, Confacal cavities, Beam quality, WUAFOSR2301A1, PE61102F    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 276    12/1    8/5

LOUISIANA STATE UNIV BATON ROUGE REMOTE SENSING AND IMAGE PROCESSING LAB

Segmentation of a High Resolution Urban Scene Using Texture Operators.    (U)

DESCRIPTIVE NOTE: Technical rept.;
SEP 82    72P    Conners,Richard W. ;Trivedi, Mohan M. ;Harlow,Charles A. ;
CONTRACT: AFOSR-81-0112
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-83-0777

UNCLASSIFIED REPORT

ABSTRACT:    This paper describes a study aimed at segmenting a high resolution black and white image of Sunnyvale, California. In this study regions were classified as belonging to any one of nine classes, residential, commercial/industrial, mobile home, water, dry land, runway/taxiway, aircraft parking, multilane highway, and vehicle parking. The classes were selected so that they directly relate to the Defense Mapping Agency's Mapping, Charting and Geodesy tangible features. To attack the problem a statistical segmentation procedure was devised. The primitive operators used to drive the segmentation are texture measures derived from cocurrence matrices. The segmentation procedure considers three kinds of regions at each level of the segmentation, uniform, boundary and unspecified. At every level the procedure differentiates uniform regions from boundary and unspecified regions. It then assigns a class label to the uniform regions. The boundary and unspecified regions are split to form higher level regions. The methodologies involved are mathematically developed as a series of hypothesis tests. While only a one level segmentation was performed studies are described which show the capabilities of each of these hypothesis tests.    (U)

DESCRIPTORS: *Image processing, *Segmented, *Mapping, *Hierarchies, *Trees, *Flow charting, *Statistics, Hypotheses, Arid land, Classification, Black(Color), Series(Mathematics), White(Color), Test methods. High resolution, Urban areas, Runways,    (U)
IDENTIFIERS: Sunnyvale, Primitive operators,    (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVJ43D

AD-A133 260      12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

A Law of the Iterated Logarithm for Non-Parametric Regression Function Estimators.                    (U)

DESCRIPTIVE NOTE: Technical rept.,
    MAY 83   19P     Hardle,Wolfgang ;
REPT. NO. MIMEO SER-1527
CONTRACT: F49620-82-C-0009
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0776

UNCLASSIFIED REPORT

ABSTRACT:    We prove a law of the iterated logarithm for nonparametric regression function estimators using strong approximations to the two dimensional empirical process. We consider the case of Nadaraya-Watson kernel estimators and of estimators based on orthogonal polynomials when the marginal density of the design variable X is unknown or known. (Author)          (U)

DESCRIPTORS: *Nonparametric statistics, Logarithm functions, Regression analysis, Estimates, Theorems                               (U)
IDENTIFIERS: Nonparametric regression, Iterated logarithms, PE61102F, WUAFOSR2304A5          (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 257      20/12

RENSSELAER POLYTECHNIC INST TROY NY

A New Profiling Technique Applicable to the Measurements Sensitive to the Free-Carrier Concentration Rather Than the Depletion Layer Thickness.          (U)

    JUN 83      6P       Davari,B. ;Das,P. ;
PROJ: 2306
TASK: B2
MONITOR: AFOSR TR-83-0735

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Electron Device Letters, vEDL-4 n6 p169-172 Jun 83. Reprint: A New Profiling Technique Applicable to the Measurements Sensitive to the Free-Carrier Concentration Rather Than the Depletion-Layer Thickness.

DESCRIPTORS: *Charge carriers, *Charge density, *Silicon, *Profiles, *Semiconductors, Hall effect, Voltage, Acoustics, Edges, Capacitance. Reprints          (U)
IDENTIFIERS: TAV(Transverse Acoustoelectric Voltage), Carrier concentrations, Acoustoelectric, ASCE(Abrupt Space Charge Edge), Nondestructive profiling, Debye lengths, Depletion layers, Spreading resistance, WUAFOSR2306B2, PE61102F          (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 253    12/1

NORTH CAROLINA UNIV AT CHAPEL HILL INST OF STATISTICS

On the Maximum Likelihood Estimate for
Logistic Errors-in-Variables Regression
Models.    (U)

DESCRIPTIVE NOTE: Annual rept.,
    MAY  83   12P    Carroll,Raymond J. ;
REPT. NO.  MIMEO SER-1528
CONTRACT: F49620-82-C-0009
PROJ: 2304
TASK: A5
MONITOR: AFOSR  TR-83-0773

UNCLASSIFIED REPORT

ABSTRACT:   Maximum likelihood estimates for errors-
in-variables models are not always root-N
consistent. We provide an example of this for
logistic regression. (Author)
DESCRIPTORS: *Probability, Regression analysis.
Logistics planning, Theorems    (U)
IDENTIFIERS: Logistic regression, Binary
regression, Maximum likelihood, WUAFOSR2304A5,    (U)
PE61102A    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 252    12/1

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL
SYSTEMS

Introduction to Dynamic Bifurcation.    (U)

DESCRIPTIVE NOTE: Interim rept.,
    MAY  83   49P    Hale,Jack K. ;
REPT. NO.  LCDS-83-16
CONTRACT: DAAG29-79-C-0161, AFOSR-81-0198
PROJ: 2304
TASK: A4
MONITOR: AFOSR  TR-83-0772

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:   Sponsored in part by Grant NSF-
MCS82-05355.
ABSTRACT:   Dynamic bifurcation theory in
differential equations is concerned with the changes
that occur in the structure of the limit sets of
solutions as parameters in the vector field are
varied. For example, if the vector field is the
gradient of a function with a finite number of
critical points, then the omega-limit set of each
orbit is an equilibrium point. Thus, one must be
concerned with how the number of equilibrium points
changes with the parameters (this is usually called
static bifurcation theory), how the stability
properties of the equilibrium points change and the
manner in which the equilibrium points are connected
to each other by orbits. If the vector field is not
the gradient of a function, then other types of
limiting motions can occur; for example, periodic
orbits, invariant tori, homoclinic and heteroclinic
orbits. The purpose of these notes is to give an
introduction to the methods used in determining how
these more complicated limit sets change as
parameters vary. (Author)    (U)
DESCRIPTORS: *Bifurcation(Mathematics),
Differential equations, Parameters, Vector
analysis, Equilibrium(General),    (U)
Points(Mathematics), Finite difference theory,
Stability, Orbits, Theorems    (U)
IDENTIFIERS: *Bifurcation theory, WUAFOSR2304A4,    (U)
PE61102F

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 249   12/1   20/9

BOSTON COLL CHESTNUT HILL MA

Dynamical Three-Point Correlations and
Quadratic Response Functions in Binary
Ionic Mixture Plasmas.                                    (U)

Xin ;      82    30P    Golden,Kenneth I. ;Lu,De-
CONTRACT: AFOSR-76-2960, NSF-ECS81-07449
PROJ: 2301
TASK: A2
MONITOR: AFOSR TR-83-0734

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Statistical
  Physics. v29 n2 p281-307 1982.
  Reprint: Dynamical Three-Point Correlations and
  Quadratic Response Functions in Binary Ionic
  Mixture Plasmas.                                       (U)

DESCRIPTORS: *Correlation techniques, *Response,
  *Plasmas(Physics), Ions, Mixtures, Nonlinear
  systems, Reprints                                      (U)
IDENTIFIERS: Binary ionic mixtures, Fluctuation
  dissipation theorems, WUAFOSR2301A2,
  PE61102F

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 248   9/2   12/1

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION
RESEARCH

Analysis of Data Flow for SIMD (Single
Instruction Multiple Data) Systems.                      (U)

DESCRIPTIVE NOTE: Technical rept.,
  MAR 83   70P    Klette,Reinhard ;
REPT. NO. CAR-TR-1, CS-TR-1257
CONTRACT: AFOSR-77-3271
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-83-0782

UNCLASSIFIED REPORT

ABSTRACT:    Starting with an exact definition of
  classes of SIMD (single instruction, multiple data)
  systems, a general approach to obtaining lower time
  bounds by data flow analysis is presented. Several
  interconnection schemes, such as the square net, the
  perfect shuffle, the infinite binary tree, etc. are
  analyzed with respect to their data transfer
  possibilities. For some types of computational
  problems the data dependencies are analyzed in a
  quantitative way. From both types of analysis,
  lower time bounds result for many combinations of
  SIMD systems and computational problems, for
  example, omega(log N) for on-line quadtree-net
  systems and the computation of Voronoi diagrams for
  N planar points, omega(N) for off-line diagonal-
  net systems and the two-dimensional discrete
  Fourier transform, and omega(square root of N)
  for off- or on-line illiac-net systems and sorting
  of N items. (Author)
DESCRIPTORS: *Parallel processing, *Data processing,
  *Computations, *Computer architecture,
  Accumulators, Problem solving, Information
  transfer, Two dimensional, Discrete fourier
  transforms
IDENTIFIERS: SIMD(Single Instruction Multiple
  Data), *Data flow, WUAFOSR2304A2,
  PE61102F

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 244    7/3    20/3

NORTHEASTERN UNIV BOSTON MASS DEPT OF PHYSICS

Magnetic Interferometer Effect in a Graphite
Intercalation Compound,    (U)

JUN 83    4P    Markiewicz,R. S. ;
Zahopoulos,C. ;
CONTRACT: F49620-82-C-0076
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0792

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v27
n12 p7820-7822, 15 Jun 83.
Reprint: Magnetic Interferometer Effect in a
Graphite Intercalation Compound.

DESCRIPTORS: *Graphite, *Magnetic properties,
*Frequency response, Interferometry, Oscillation,
Charge transfer, Reprints    (U)
IDENTIFIERS: Graphite intercalation compounds,
WUAFOSR2306C3, PE61102F    (U)

AD-A133 244

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 246    7/4    5/11

OREGON UNIV EUGENE DEPT OF PHYSICS

International Conference on X-Ray and
Atomic Inner-Shell Physics.    (U)

83    7P    Crasemann,Bernd ;
CONTRACT: F49620-83-K-0020
PROJ: 2301
TASK: A4
MONITOR: AFOSR TR-83-0742

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Comments on Atomic and
Molecular Physics, v13 p253-258 1983.
Reprint: International Conference on X-Ray and
Atomic Inner-Shell Physics.

DESCRIPTORS: *Physics, *Symposia, Atomic orbitals,
X ray spectra, Technology transfer, Reports,
Reprints    (U)
IDENTIFIERS: WUAFOSR2301A4, PE61102F    (U)

AD-A133 246

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 243    8/11

HAWAII INST OF GEOPHYSICS HONOLULU

Spectral Characteristics of High-Frequency P(N), S(N) Phases in the Western Pacific,    (U)

    MAY 83    12P    Walker,Daniel A. ;
McCreery,Charles S. ;Sutton,George H. ;
REPT. NO.  HIG-CONTRIB-1354
CONTRACT:  F49620-81-C-0065,  F49620-79-C-0007
PROJ:  2309
TASK:  A1
MONITOR:  AFOSR  TR-83-0784

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Geophysical Research, v88 nNB5 p4289-4298, 10 May 83. Reprint: Spectral Characteristics of High-Frequency P(N), S(N) Phases.

DESCRIPTORS:  *Earthquakes, *Seismic data, Pacific Ocean, High frequency, Traveling waves, Phase measurement, Seismic waves, Reprints.    (U)
IDENTIFIERS:  PN phases, SN phases, WUAFOSR2309A1, PE61102F    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 236    12/1

NORTH CAROLINA UNIV AT CHAPEL HILL INST OF STATISTICS

On Jackknifing Kernel Regression Function Estimators.    (U)

DESCRIPTIVE NOTE:  Technical rept.,
    MAY 83    12P    Hardle,Wolfgang ;
REPT. NO.  MIMEO SER-1526
CONTRACT:  F49620-82-C-0009
PROJ:  2304
TASK:  A5
MONITOR:  AFOSR  TR-83-0775

UNCLASSIFIED REPORT

ABSTRACT:    Estimation of the value of a regression function at a point of continuity using a kernal-type estimator is discussed and improvements of the technique by a generalized jackknife estimator are presented. It is shown that the generalized jackknife technique produces estimators with faster bias rates. In a small example it is investigated, if the generalized jackknife method works for all choices of bandwidths. It turns out that an improper choice of this parameter may inflate the mean square error of the generalized jackknife estimator. (Author)    (U)
DESCRIPTORS:  *Regression analysis, *Nonparametric statistics, *Estimates, Value, Continuity, Rates, Bias, Reduction, Bivariate analysis, Computations, Random variables    (U)
IDENTIFIERS:  Kernels, Jackknife method, WUAFOSR2304A5, PE61102F    (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 189   12/1   9/2   (U)

YALE UNIV NEW HAVEN CT DEPT OF COMPUTER SCIENCE

An Investigation of the Use of Iterative
Linear Equation Solvers in Codes for Large
Stiff Systems of ODE's.

DESCRIPTIVE NOTE: Final rept.,
  JUL 83   8P   Chan,Tony ;
CONTRACT: AFOSR-81-0193
PROJ: 2304
TASK: A3
MONITOR: AFOSR TR-83-0746

UNCLASSIFIED REPORT

ABSTRACT:   This project deals with the problem of
solving large systems of stiff ODEs. In
particular, seen as one of the major issues is the
choice of methods for solving the systems of linear
and nonlinear equations that arise at each
integration step. It is proposed to use variants of
the preconditioned conjugate gradient method for
solving the linear equations, and truncated Newton-
like iterations for solving the nonlinear equations.
The main objective is to determine whether the use
of iterative methods for solving linear systems of
algebraic equations in codes for large stiff systems
of ODEs is competitive with sparse direct
techniques. A more tangible objective is to produce
a computer program that incorporates such an
approach.   (U)
DESCRIPTORS: *Iterations, *Linear algebraic
equations, *Problem solving, Machine coding,
Algorithms, Stiffness, Sparse matrix, Computer
programs, Gradients, Analysis of variance   (U)
IDENTIFIERS: Computer codes, WUAFDSR2304A3,
PE61102F   (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A133 195   20/1   1/1

ILLINOIS INST OF TECH CHICAGO DEPT OF MECHANICAL
ENGINEERING

Coherent Structures and Jet Noise.   (U)

F. ...
  OCT 82   10P   Arndt,R. E. A. ;Long,D.
CONTRACT: F49620-80-C-0053
PROJ: 2307
TASK: A2
MONITOR: AFOSR TR-83-0740

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in The Shock and Vibration
Digest, v14 n10 p3-10 Oct 82.
Reprint: Coherent Structures and Jet Noise.   (U)

DESCRIPTORS: *Jet engine noise, *Noise reduction,
Turbulent flow, Structural analysis, Aerodynamics,
Efficiency, Motion, Acoustics, Reprints   (U)
IDENTIFIERS: *Aeroacoustics, Coherent structures,
WUAFDSR2307A2, PE61102F   (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A132 878    (2/1    15/5

CALIFORNIA UNIV BERKELEY OPERATIONS RESEARCH CENTER

On the Use of Replacements to Extend System
Life.    (U)

DESCRIPTIVE NOTE: Research rept.,
     JUN  83   49P   Derman,Cyrus ;Lieberman,
     Gerald J. ;Ross,Sheldon M. ;
REPT. NO.   ORC-83-3
CONTRACT: AFOSR-81-0122
PROJ:  2304
TASK:  A5
MONITOR: AFOSR  TR-83-0812

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:    Sponsored in part by Contract
N00014-75-C-0561.
ABSTRACT:    This paper is concerned with the
     following question. A system has one vital
     component for which there are n spares. Whenever
     the vital component fails, the system fails. The
     authors like to schedule the replacement of the vital
     component with the spares so as to prolong the life
     of the system as much as possible. This problem can
     be generalized to where there are several components
     in the system and the scheduling of replacements
     refers to each of the components. They deal mainly
     with the first question but treat, to some extent, a
     special case of the second. The next to final
     section considers a generalization which allows for
     the vital component to fail a fixed number of times
     before causing the system to fail.    (U)
DESCRIPTORS: *Replacement theory, *Spare parts,
     *Computations, Scheduling, Optimization,
     Failure, Surveillance, Intervals, Life
     expectancy(Service life), Systems analysis    (U)
IDENTIFIERS: PE61102F, WUAFOSR2304A5    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A133 186    20/8    7/4

IRT CORP SAN DIEGO CA

Experimental Studies of Secondary Ion
Emission from Well-Characterized Surfaces.    (U)

DESCRIPTIVE NOTE: Interim rept.,
     MAY  83   25P   Palmer,R. L. ;
REPT. NO.   IRT-8213-002
CONTRACT: F49620-81-C-0013
PROJ:  2301
TASK:  A7
MONITOR: AFOSR  TR-83-0747

UNCLASSIFIED REPORT

ABSTRACT:    The emission of ions from surfaces has
     been investigated using a specially constructed
     secondary-ion mass and energy analyzer. The energy
     spectra of H-(D-) and H+(D+) secondary ions
     produced by the impact of energetic incident ions
     such as H+, H2+, H3+, Ar+, and He+ on
     polycrystalline molybdenum foil and single crystal
     W(110) have been measured. The secondary energy
     spectra and yield are relatively insensitive to the
     ion type and energy, but very sensitive to the
     physical-chemical state of the surface. In
     particular, the addition of cesium increases the
     negative ion yield of molybdenum and tungsten by
     several orders of magnitude as well as shifting the
     energy distribution to lower energies. The
     spontaneous emission of H- from W(110) was
     observed in an ambient of cesium vapor and hydrogen
     at temperatures above 600 K. The mechanism in
     this case appears to be surface chemi-ionization.
     The energy spectrum for this process is similar to
     that resulting from ion impact at low energies, but
     the surface chemi-ionization spectrum lacks the
     higher energy tail (E is less than 10 eV)
     characteristic of secondary ion emission.    (U)
DESCRIPTORS: *Particle collisions, *Secondary
     emission, *Mass spectrometry, Tungsten,
     Molybdenum, Cesium, Anions, Surface reactions,
     Energy levels, Ionization, Hydrogen, Mass
     spectrometers    (U)
IDENTIFIERS: SIMS(Secondary Ion Mass
     Spectrometer), PE61102F, WUAFOSR2301A7    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A132 796    12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

Convex-Ordering among Functions, with Applications to Reliability and Mathematical Statistics.    (U)

DESCRIPTIVE NOTE: Technical rept.,
    JUL 83    19P    Chan,Wai ;Proschan,Frank ;
Sethuraman,Jayaram ;
REPT. NO. FSU-STATISTICS-M661, TR-83-158-AFOSR
CONTRACT: DAAG29-82-K-0168, AFOSR-82-0007
MONITOR: ARO,AFOSR 19367.6-MA,TR-83-158

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also available as Rept. no. TR-D-61-ARO
ABSTRACT: Hardy, Littlewood and Polya (1934) introduced the notion of one function being convex with respect to a second function and developed some inequalities concerning the means of the functions. We use this notion to establish a partial order called convex-ordering among functions. In particular, the distribution functions encountered in many parametric families in reliability theory are convex-ordered. We have formulated some inequalities which can be used for testing whether a sample comes from F or G, when F and G are within the same convex family. Performance characteristics of different coherent structures can also be compared with respect to this partial ordering. For example, we will show that the reliability of a k+1-out-of-n system is convex with respect to the reliability of a k-out-of-n system. When F is convex with respect to G, the tail of the distribution F is heavier than that of G; therefore, our convex ordering implies stochastic ordering. The ordering is also related to total positivity and monotone likelihood ratio families. This provides us a tool to obtain some useful results in reliability and mathematical statistics.    (U)

DESCRIPTORS: *Distribution functions, *Order statistics, Inequalities, Stochastic processes, Coherence, Reliability, Statistical analysis, Life tests, Theorems    (U)
IDENTIFIERS: Convex ordering    (U)

AD-A132 796    UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 923    17/2    20/6    9/2

CITY COLL NEW YORK

Acquisition, Image and Data Compression.    (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Mar 81-28 Feb 83,
    APR 83    109P    Schilling,Donald L. ;
Eichmann,George ;
CONTRACT: AFOSR-81-0169
PROJ: 2305
TASK: B1
MONITOR: AFOSR TR-83-0505

UNCLASSIFIED REPORT

ABSTRACT: This report discusses the following subjects: (1) A new technique to achieve a fast PN Acquisition scheme; (2) A comparison of schemes for coarse acquisition of frequency-hopped spread-spectrum signals; (3) Investigation of the tracking of frequency hopped spread spectrum signals in adverse environments; (4) Coherent optical production of the Hough transform; (5) Estimation of the closely spaced frequencies buried in white noise using linear programming; (6) Restoration of discrete Fourier spectra using linear programming; (7) Two-dimensional optical filtering of 1-D signals; (8) Random TDMA Access Protocol with application to multi beam satellites; and (9) A reservations scheme of multiple access for local networks.    (U)

DESCRIPTORS: *Optical communications, *Image processing, *Data compression, Signals, Acquisition, Tracking, Frequency agility, Channels, Two dimensional, Optical filters, Artificial satellites, Fourier analysis, Spectrum analyzers, Linear programming, Multiple access, White noise, One dimensional    (U)
IDENTIFIERS: WUAFOSR2305B1, PE61102F    (U)

AD-A131 906   12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U)

Asymptotic Maximal Deviation of M- Smoothers.

DESCRIPTIVE NOTE: Technical rept.,
APR 83   21P   Haerdle,Wolfgang ;
REPT. NO. MMS-1523
CONTRACT: F49620-82-C-0009
PROJ: 2304
TASK: A5
MONITOR: AFOSR TR-83-0688

UNCLASSIFIED REPORT

ABSTRACT: Probabilities of maximal deviation are computed in a similar way as in Bickel and Rosenblatt (1973) for density estimation and in Johnston (1982) for nonparametric regression function estimation. (U)
DESCRIPTORS: *Functions(Mathematics), *Regression analysis, *Probability, Computations, Estimates, Density, Taylors series, Nonparametric statistics, Approximation(Mathematics),
IDENTIFIERS: Transformations(Mathematics), Inequalities *Smoothing(Mathematics), Robust procedures, Maximal deviation, PE61102F, WUAFOSR2304A5 (U)

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AD-A131 860   20/5   7/4   20/6

CITY COLL NEW YORK DEPT OF PHYSICS

(U)

Semiconductors Investigated by Time Resolved Raman Absorption and Photoluminescence Spectroscopy Using Femtosecond and Picosecond Laser Techniques.

DESCRIPTIVE NOTE: Final rept. 1 Dec 79-30 Nov 82,
MAY 83   71P   Alfano,Robert R. ;Doukas, Apostolos G. ;
REPT. NO. 05423-F
CONTRACT: AFOSR-80-0079
PROJ: 2305
TASK: C1
MONITOR: AFOSR TR-83-0694

UNCLASSIFIED REPORT

ABSTRACT: This report summarizes the research progress achieved in the period 1979-1982 in the research effort supported by AFOSR 80-0079. Two main areas of research are: picosecond and subpicosecond laser development and application and time-resolved studies of semiconductors. In the subpicosecond laser development program we investigated a variety of cavities of different physical parameters. A stable and reliable oscillator, which produces 200 fsec pulses, has been developed using a ring configuration. The first generation amplifier system has been completed with a gain of 10 to the sixth power. We have produce continuum by focusing the amplified pulses in a CC14 cell; and have invented a femtosecond luminescence technique (called population mixing) for probing semiconductor processes. (Author) (U)
DESCRIPTORS: *Raman spectra, *Photoluminescence, *Dye lasers, *Spectroscopy, Laser amplifiers, Interactions, Fluorescence, Laser cavities, Rings, Phonons, Glass, Electrons, Heat treatment, Time (U)
IDENTIFIERS: Femtosecond lasers, Picosecond lasers, Glass lasers, Picoesecond laser amplifiers, Electron hole plasmas, Thermalization, Time resolve studies, WUAFOSR2305C1, PE61102F (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 837    20/14

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF PHYSICS

Studies of Collisional and Nonlinear
Radiative Processes for Development of
Coherent UV and XUV Sources.                                      (U)

DESCRIPTIVE NOTE:  Final rept. 1 Oct 81-30 Nov 82,
    SEP 82    69P    Rhodes,Charles K. ;Pummer,
    Herbert  ;Egger,Hans ;
CONTRACT:  AFOSR-79-0130
PROJ:  2301
TASK:  A1
MONITOR:  AFOSR  TR-83-0713

UNCLASSIFIED REPORT

ABSTRACT:    High spectral brightness rare gas
halogen (RGH) sources can be used to generate
coherent extreme ultraviolet radiation by either
harmonic generation mechanisms or direct multiquantum
excitation of appropriate gain media. In order to
demonstrate the basic characteristics of these two
approaches, recent comparative measurements have been
made. With the use of a 4 GW 193 nm (ArF*)
system operating at a pulse duration of 10 ps,
harmonic generation has been studied in several
atomic and molecular media and used to generate 20
kW at 64.3 nm and 200 W at 38.6 nm. In
addition, stimulated emission in molecular hydrogen
on both the Lyman and Werner bands excited by two
quantum absorption at 193 nm, has resulted in the
generation of radiation as short as 117.6 nm at an
efficiency of conversion approaching one percent.
It has been concluded that the latter method is
superior for the generation of short wavelength
radiation. Extension of these results to both
shorter wavelengths and higher power levels requires
the ultraviolet. Recent studies of collision-free
multiply-charged ion production with irradiation at
193 nm point to an anomalously strong coupling to
high Z materials with processes involving as many
as 99 quanta being observed. These multiquantum
processes in the 40 - 80 eV rane in certain atomic
systems can be generated with existing laser
instrumentation. (Author)                           (U)

DESCRIPTORS:  *Ultraviolet radiation, *Wave
propagation, *Sources, Vacuum ultraviolet radiation.
Range(Extremes), Argon lasers, Pulsed lasers,       (U)
IDENTIFIERS: RGH(Rare Gas Halogen),                 (U)
    AD-A131 837

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO.  EVJ43D

AD-A131 835    7/3    7/4

NORTH DAKOTA STATE UNIV FARGO DEPT OF CHEMISTRY

Organic Sonochemistry. Ultrasonic
Acceleration of the Hydrosilation Reaction.         (U)

DESCRIPTIVE NOTE:  Rept. for 1 Nov 82-31 Oct 83,
    83    4P    Han,Byung-Hee ;Boudjouk,
    Philip ;
CONTRACT:  AFOSR-80-0239
PROJ:  2303
TASK:  B2
MONITOR:  AFOSR  TR-83-0707

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Pub. in Organometallics, v2 p769-771
    1983.
    Reprint: Organic Sonochemistry. Ultrasonic
    Acceleration of the Hydrosilation Reaction.

DESCRIPTORS:  *Ultrasonics, *Catalysis, *Addition
    reactions, Silanes, Platinum, Alkenes, Alkynes,
    Chemical reactions, Chemical bombs, Reprints       (U)
IDENTIFIERS:  Sonochemistry, Hydrosilation           (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 817    7/3

NORTH DAKOTA STATE UNIV FARGO DEPT OF CHEMISTRY

Palladium-Catalyzed and Sonically Accelerated
Hydrogenations of Olefins Using Formic Acid
as a Hydrogen Transfer Agent,    (U)

Hee ;    83    5P    Boudjouk,Philip ;Han,Byung-
CONTRACT: AFOSR-80-0239
PROJ: 2303
TASK: B2
MONITOR: AFOSR TR-83-0708

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Catalysis, v79
p489-492 1983.
Reprint: Palladium-Catalyzed and Sonically
Accelerated Hydrogenations of Olefins Using Formic
Acid as a Hydrogen Transfer Agent.

DESCRIPTORS: *Olefin polymers, *Hydrogenation,
*Catalysis, Formic acid, Hydrogen, Palladium,
Ultrasonics, Catalysts, Benzene, Acetylenes,
Reprints
IDENTIFIERS: Sonochemistry, PE61102F,
WUAFOSR2303B2.    (U)    (U)

AD-A131 817

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 824    12/1    20/4

RENSSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL
SCIENCES

Adaptive Finite Element Methods for
Parabolic Partial Differential Equations.    (U)

DESCRIPTIVE NOTE: Interim rept.,
MAY 83    23P    Flaherty,Joseph E. ;Coyle,
J. Michael ;Ludwig,Raymond ;Davis,Stephen F.
;
CONTRACT: DAAG29-82-K-0197, NAS1-17070
PROJ: 9749
TASK: 03
MONITOR: AFOSR TR-83-0689

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in Part by Grant
AFOSR-80-0192.
ABSTRACT: The authors discuss a finite element
method for solving initial-boundary value problems
for vector systems of partial differential equations
in one space dimension and time. The method
automatically adjusts the computational mesh as the
solution evolves in time so as to approximately
minimize the local discretization error. They are
thus able to calculate accurate solutions with fewer
elements than would be necessary with a uniform mesh.
This overall method contains two distinct steps: a
solution step and a mesh selection step. They solve
the partial differential equations using a finite
element-Galerkin method on trapezoidal space-time-
elements with either piecewise linear or cubic
Hermits polynomial approximations. A variety of
mesh selection strategies are discussed and analyzed.
Results are presented for several computational
examples.    (U)
DESCRIPTORS: *Finite element analysis, *Partial
differential equations, *Boundary value problems,
Problem solving, Vector analysis. Computations,
Mesh, Algorithms, Solutions(General)    (U)
IDENTIFIERS: Parabolic equations, Galerkin method,
PE61102F, WUAFOSR974903    (U)

AD-A131 824

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 810    20/13    12/1

NORTHWESTERN UNIV EVANSTON IL

Thermal Waves in an Absorbing and Convecting
Medium.    (U)

DESCRIPTIVE NOTE: Technical rept.
    83    12P    Rosenau,Philip ;Kamin,
Shoshana ;
CONTRACT: AFOSR-78-3602, AFOSR-76-2881
PROJ: 2304
TASK: A3
MONITOR: AFOSR TR-83-0691

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physica, v26SD 11p
1983.
Reprint: Thermal Waves in an Absorbing and
Convecting Medium.

DESCRIPTORS: *Mathematical models, *Thermal
analysis, Absorption, Convection(Heat transfer),
Diffusion theory, Reprints
IDENTIFIERS: PE61102F, WUAFOSR2304A3    (U)
                                        (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 814    20/5    7/4    21/2    20/4

STANFORD UNIV CA HIGH TEMPERATURE GASDYNAMICS LAB

Advanced Diagnostics and Instrumentation for
Chemically Reactive Flow Systems.    (U)

DESCRIPTIVE NOTE: Final scientific rept. 1 Sep 80-30
Sep 82.
NOV 82    89P    Hanson,R. K. ;Baganoff,D.
;Bowman,C. T. ;Byer,R. L. ;Cantwell,B. J.

CONTRACT: F49620-80-C-0091
PROJ: 2308
TASK: A1
MONITOR: AFOSR TR-83-0705

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates. All
DTIC and NTIS reproductions will be in black and white.
See also report dated Sep 81, AD-A111 912.
ABSTRACT:    Progress is reported at the completion
of two years of an interdisciplinary program to
investigate and establish modern diagnostic
techniques for application to reacting flows.
Project areas include: (1) optical probes for
species measurements employing tunable ultraviolet,
visible and infrared laser sources; (2) coherent
anti-Stokes Raman spectroscopy (CARS) for
temperature and velocity measurements in a supersonic
jet; (3) computed absorption tomography for species
measurements in a plane; (4) particle sizing
techniques, especially for rocket exhausts; (5) fast-
response temperature monitor, based on line-reversal
concepts; (6) quantitative flow visualization.
including temporally and spatially resolved species
measurements in a plane using laser-induced
fluorescence; (7) multiple-point velocity
visualization; (8) application of modern diagnostics
to a two-dimensional reacting shear layer; (9)
development of measurement techniques and a novel
facility for investigations of droplet evaporation in
turbulent flows; (10) holographic display techniques
for 3-D visualization of flowfield data; (11)
spatially resolved laser absorption spectroscopy
using optical Stark shifting; and (12) fast-
scanning dye laser for measurements of species.
temperature and fundamental spectral parameters.
(Author)

DESCRIPTORS: *Infrared lasers, *Ultraviolet laser    (U)
                                                      (U)
AD-A131 814    UNCLASSIFIED    PAGE

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO  EVJ43D

AD-A131 794    5/2    7/4

NATIONAL SCIENCE FOUNDATION WASHINGTON DC DIV OF MATERIAL
SCIENCES

International Conference on Vibrations at
Surfaces (3rd) Held at Asilomar, California
(USA) September 1-4, 1982.                                    (U)

DESCRIPTIVE NOTE: Technical rept.,
   SEP  82  124P    Morawitz,Hans ;
CONTRACT: AFOSR-ISSA-82-00029
MONITOR: AFOSR TR-83-0647

       UNCLASSIFIED REPORT

ABSTRACT:    This report contains reports from the
   Third International Conference On
   Vibrations at Surfaces, held at Asilomar
   Conference Grounds, Pacific Grove,
   California, 1-4 September 1982.               (U)
DESCRIPTORS:  *Symposia, *Surface analysis,
   *Molecular vibration, Abstracts, Reports,
   vibrational spectra, spectroscopy, Surface reacti    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO.  EVJ43D

AD-A131 790    20/8

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

Electronic-to-Vibrational Energy Transfer
from I*(5(2)P1/2) to I2(25<v<43),            (U)

   83    11P    Hall,G. E. ;Marinelli,W.
J.;Houston,P. L. ;
CONTRACT: AFOSR-78-3513
PROJ: 2303
TASK: B1
MONITOR: AFOSR  TR-83-0716

       UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Pub. in Jnl. of Physical
   Chemistry, v87 n12 p2153-2161 1983.
   Reprint: Electronic-to-Vibrational Energy Transfer
   from I*(5(2)P1/2) to I2(25<v<43).

DESCRIPTORS: *Electronic states, *Molecular
   vibration, Energy transfer, Energy levels,
   Transitions, Pulsed lasers, Iodine, Reprints
IDENTIFIERS: Nascent iodine, PE61102F,
   WUAFOSR2303B1

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 785    20/2    11/6    9/1    20/12

WASHINGTON UNIV ST LOUIS MO SEMICONDUCTOR RESEARCH LAB

Clustering and Ordering in III-V Alloys.    (U)

DESCRIPTIVE NOTE:   Annual scientific rept. 1 Jun 82-31 May 83.
JUL 83    57P    Wolfe,C. M. ;Muller,M.
W. ;Davis,G. A. ;Hsieh,S. Julie ;Salzman.
K. A.
REPT. NO: WU/SRL-59583-1
CONTRACT: AFOSR-82-0231
PROJ: 2306
TASK: B1
MONITOR: AFOSR TR-83-0715

UNCLASSIFIED REPORT

ABSTRACT:    The III-/ semiconducting alloys are
typically grown by epitaxial techniques at
temperatures where, in the absence of substrate
effects, they are thermodynamically unstable. This
can result in problems associated with clustering of
like atoms or ordering of unlike atoms. Long-range
ordering could yield interesting III-V ternary
compounds. Several concepts are discussed which
could reduce clustering and promote long-range
ordering in III-V alloys. Recent results
indicate that the local atomic structure in
GaxIn1-xAs is chalcopyrite-like and that long-
range ordering may be thermo-dynamically feasible.
Kinetically, it is suggested that growth on
substrates could promote long-range order.    (U)
DESCRIPTORS:    *Epitaxial growth, Alloys,
Clustering, Semiconductor devices, Group III
compounds, Group V compounds, Crystal growth.
Crystal structure, Gallium arsenides, Indium
phosphides, Zinc alloys, Thermodynamics, Reaction
kinetics, Atomization, Morphology,
Orientation(Direction), Photoconductivity,
Charge carriers, Heterojunctions, Crystal
lattices, Substrates, Electron mobility,
Semiconductor diodes, Schematic diagrams,
Reflection    (U)
IDENTIFIERS: Chalcopyrites, Sphalerite compounds,
WUAFOSR2306B1, PE61102F    (U)

AD-A131 785    UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 779    9/1    20/14

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

Radiation Measurements from an Inverted
Relativistic Magnetron.    (U)

JUL 83    6P    Close,R. A. ;Palevsky,A. ;
Bekefi,G. ;
CONTRACT: F49620-83-C-0008
PROJ: 2301
TASK: A1
MONITOR: AFOSR TR-83-0722

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:   Pub. in Jnl. of Applied Physics.
v54 n7 p4147-4151 Jul 83.
Reprint: Radiation Measurements from an Inverted
Relativisic Magnetron.

DESCRIPTORS:   *Magnetrons, *Radiation,
*Measurement, Resonators, Reprints    (U)
IDENTIFIERS: Microwave emission, WUAFOSR2301A1,
PE61102F    (U)

AD-A131 779    UNCLASSIFIED

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 777    7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF
ELECTRONICS

Study of Excited State Energy Transfer
Processes.                                          (U)

DESCRIPTIVE NOTE:  Final rept. 1 Jan 81-31 Dec 82.
    MAY 83    3P    Barthel,J. R. ;Duff.R. ;
E. ;Proffer.W. J. ;
CONTRACT: AFOSR-81-0067
PROJ: 2301
TASK: A4
MONITOR: AFOSR TR-83-0619

ABSTRACT:    Several scaling and fitting laws for
Rotationally Inelastic (RI) collisions have
been developed and applied. These laws will provide
a compact description of collisional processes for
use in technological applications.                 (U)
DESCRIPTORS: *Lithium compounds, *Collisions,
*Energy transfer, Inelastic scattering, Cross
sections. Xenon. Velocity, Energy levels           (U)
IDENTIFIERS: WUAFOSR2301A4, PE61102F               (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 767    7/4    14/2

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

Conductometric Sensor for Atmospheric Carbon
Dioxide Determination.                             (U)

    JUN 83    7P    Symanski,J. S. ;Martinchek,
G. A. ;Bruckenstein,Stanley ;
CONTRACT: AFOSR-78-3621
PROJ: 2303
TASK: A1
MONITOR: AFOSR TR-83-0718

SUPPLEMENTARY NOTE:  Pub. in Analytical Chemistry, v55
n7 p1152-1158 Jun 83.
Reprint: Conductometric Sensor for Atmospheric
Carbon Dioxide Determination.

DESCRIPTORS: *Measuring instruments, *Electrical
conductivity, *Carbon dioxide, Laboratory equipment,
Gas detectors, Gas analysis, Theory, Chemical
equilibrium, Reprints                              (U)
IDENTIFIERS: *Conductometric sensor,               (U)
WUAFOSR2303A1, PE61102F

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 760    20/9    12/1

BOSTON COLL CHESTNUT HILL MA DEPT OF PHYSICS

Exact Dynamical Polarizability for One-
Component Classical Plasmas,    (U)

SEP 82    12P    Carini,P. ;Kalman,G. ;
Golden,K. I. ;
CONTRACT: AFOSR-81-0091
MONITOR: AFOSR TR-83-0726

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v26
n3 p1686-1695 Sep 82.
Reprint: Exact Dynamical Polarizability for One-
Component Classical Plasmas.

DESCRIPTORS: *Plasmas(Physics), Polarization,
*Computations, Solutions(General),
Approximation(Mathematics), Correlation,
Collisions, Reprints    (U)
IDENTIFIERS: PE61102F    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 765    7/5

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

A New Probe of Solvent Accessibility of
Bound Photosensitizers. 1. Ruthenium(II) and
Osmium(II) Photosensitizers in Sodium Lauryl
Sulfate Micelles.    (U)

83    6P    Hauenstein,B. L. ,    Jr. ;
Dressick,W. J. ;Buell,S. L. ;Demas,J. N.
;DeGraff,B. A. ;
CONTRACT: AFOSR-78-3590, NSF-CHE82-06279
PROJ: 2303
TASK: B2
MONITOR: AFOSR TR-83-0719

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American
Chemical Society, v105 n13 p4251-4255 1983.
Reprint: A New Probe of Solvent Accessibility of
Bound Photosensitizers. 1. Ruthenium(II) and
Osmium(II) Photosensitizers in Sodium Lauryl
Sulfate Micelles.

DESCRIPTORS: *Photochemical reactions,
*Photosensitivity, *Measurement, Solvents,
Ruthenium, Osmium, Sodium sulfates, Laurates,
Reprints    (U)
IDENTIFIERS: Micelles, Sodium lauryl sulfate
micelles, Photosensitizers, WUAFOSR2303B2,
PE61102F    (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 726   9/1   7/4   11/9

ROCKWELL INTERNATIONAL ANAHEIM CA AUTONETICS STRATEGIC SYSTEMS DIV

Mechanisms and Kinetics of Diphthalocyanine Electrode Processes.   (U)

DESCRIPTIVE NOTE:  Final rept. 1 May 80-31 Mar 83,
JUL 83   31P   Nicholson,M. M. ;Weismuller,
T. P.;Pizzarello,F. A. ;
REPT. NO. C83-522/201
CONTRACT: F49620-80-C-0060
PROJ: 2303
TASK: B2
MONITOR: AFOSR TR-83-0721

UNCLASSIFIED REPORT

ABSTRACT:      Redox processes of lutetium diphthalocyanine were investigated by chemical, electrochemical, and optical spectroscopic methods. Oxidized films of the dye slowly reverted from the red to the green state on standing in moist air. The rate of this color change depended on the nature of the anion that had been incorporated during the oxidation. The feasibility of faster chemical switching and of color cycling by indirect coulometry was demonstrated. Slow-scan cyclic voltammetry of film specimens on tin oxide electrodes provided evidence of incipient phase transitions in blue reduced forms of the dye. The current-voltage curves could be interpreted on the basis of a model in which the electron-transfer processes were assumed to be much faster than the phase transitions. Finally, the role of oxygen in the dye system was elucidated through discovery of a reversible oxygen reaction with lutetium diphthalocyanine in dimethylformamide solution. This information explains some apparent discrepancies in the chemistry of rare-earth diphthalocyanines and provides an important link in the formulation of a unified redox reaction scheme. (Author)   (U)
DESCRIPTORS: *Electrodes, *Electrochemistry,
*Phthalocyanines, *Reaction kinetics, Rare earth compounds, Oxidation reduction reactions, Optical properties, Spectroscopy, Chemical shifts, Coulometers, Films, Cyclic Tests,
Voltammetry   (U)
IDENTIFIERS: WUAFOSR2303B2, PE61102F   (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 745   12/1   20/9

BOSTON COLL CHESTNUT HILL MA

Moment Expansion of the Kinetic Equation and Its Application to Strongly Coupled Plasmas.   (U)

JUL 82   8P   Golden,K. I. ;Kalman,G. ;
CONTRACT: AFOSR-76-2960
PROJ: 2301
TASK: A2
MONITOR: AFOSR TR-83-0727

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Prepared in cooperation with Northeastern Univ., Boston, MA. Dept. of Electrical Engineering. Pub. in Physical Review A, v26 n1 p631-636 Jul 82.
Reprint: Moment Expansion of the Kinetic Equation and Its Application to Strongly Coupled Plasmas.

DESCRIPTORS: *Equations, *Kinetic theory,
*Plasmas(Physics), Computations, Polarization,
Coupling(Interaction), Reprints   (U)
IDENTIFIERS: PE61102F, WUAFOSR2301A2   (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 723   19/1   7/3   11/9

MICHIGAN TECHNOLOGICAL UNIV HOUGHTON DEPT OF CHEMISTRY AND CHEMICAL ENGINEERING

Potential Energetic Materials Formed from
Coupling of Substituted Halo-s-triazines.   (U)

DESCRIPTIVE NOTE: Final rept. 1 Jun 82-31 May 83.
    JUL 83   11P   Reynolds.G. Fredric ;
CONTRACT: AFOSR-82-0191
PROJ: 2303
TASK: D9
MONITOR: AFOSR TR-83-0712

UNCLASSIFIED REPORT

ABSTRACT:   The coupling of nucleophilic sites on
substituted halo-s-triazines to electrophilic sites
on other heterocyclic rings has been investigated.
For example, by this type of reaction, 2,4-
dichloro-6-dimethylmalonyl-s-triazine has been
coupled to 2,4,6-trichloropyrimidine in good yield,
and to 2,4,6-trichloro-s-triazine in very small
yield. Attempts to form longer chains or rings by
additional reaction in this manner with the coupled
products has not as yet resulted in any significant
yield of the desired product. (Author)   (U)
DESCRIPTORS: *Triazines, *Energetic properties,
*Coupling(Interaction), *Heterocyclic compounds,
Nucleophilic reactions, Substitution reactions,
Halides, Rings, Molecular structure,
Pyrimidines, Chlorine, Addition reactions   (U)
IDENTIFIERS: Coupling(Chemistry), Polymer
chemistry, Halotriazines, Heterocyclic rings.
PE61102F, WUAFOSR2303D9   (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 722   9/2   5/7

DELAWARE UNIV NEWARK DEPT OF COMPUTER AND INFORMATION SCIENCES

Prerequisites for Deriving Formal
Specifications from Natural Language
Requirements.   (U)

DESCRIPTIVE NOTE: Final rept. 1 Sep 81-28 Feb 83,
    APR 83   13P   Weischedel,Ralph M. ;
CONTRACT: F49620-79-C-0131, AFOSR-80-0190
PROJ: 2304
TASK: A2
MONITOR: AFOSR TR-83-0687

UNCLASSIFIED REPORT

ABSTRACT:   Since English specifications and
formal specifications of modules are complementary
and since formal specifications require so much
effort to write, our work has investigated
application of artificial intelligence techniques to
aid in the software specification process. The
effort for this year concentrated on constructing a
small prototype of a system that transforms English
descriptions to formal specifications under
significant user assistance.   (U)
DESCRIPTORS: *Computer programming, *Natural
language, *Artificial intelligence, Computer
programs, Specifications, Requirements, User
needs, Prototypes, Modular construction, Parsers,
Dictionaries, Syntax, Semantics, Heuristic
methods, Computational linguistics, Machine
translation   (U)
IDENTIFIERS: PE61102F, WUAFOSR2304A2   (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 720   20/5   7/4

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

Laser Physics and Laser Spectroscopy.   (U)

DESCRIPTIVE NOTE: Final technical rept. 15 Mar 81-14 Apr 83,
JUN 83   83P   Byer,Robert L. ;
REPT. NO.  GL-3598
CONTRACT: F49620-81-C-0047
PROJ: 2301
TASK: A1
MONITOR: AFOSR TR-83-0733

UNCLASSIFIED REPORT

ABSTRACT:   During the past yer a theoretical study of lase ionization mass spectroscopy has been completed. The study evaluated laser ionization combined with Fourier transform mass spectroscopy. A second generation single crystal fiber growth machine has been completed and high quality fibers of sapphire have been grown. Rapid progress in the growth and evaluation of small diameter single crystal fibers for nonlinear optical device application is being made. Theoretical model studies for laser plasma pumping of indium ion for a vacuum ultraviolet laser source have been carried out. Experiments have been initiated. The laser produced plasma X-ray source to other X-ray sources such as synchrotron and rotating anodes have been studied and compared. It is clear that the laser plasma X-ray source has an important role to play in soft X-ray spectroscopy, X-ray lithography and X-ray microscopy.   (U)
DESCRIPTORS: *Ultraviolet lasers, *Mass spectroscopy, *Physics, Ionization, Single crystals, Vacuum, X ray spectroscopy, Lithography, Microscopy, Anodes, Synchrotrons   (U)
IDENTIFIERS: Laser physics, Laser spectroscopy, X ray lithography, X ray microscopy, Rotating anodes, PE61102F, WUAFOSR2301A1   (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 709   20/5   20/6   2C/8

BOSTON COLL CHESTNUT HILL MA DEPT OF CHEMISTRY

Chemiluminescence and Laser Induced Fluorescence of Boron Atom Reactions   (U)

DESCRIPTIVE NOTE: Final progress rept.,
JUN 83   21P   Davidovits,Paul ;
CONTRACT: AFOSR-80-0061
PROJ: 2303
TASK: B1
MONITOR: AFOSR TR-83-0717

UNCLASSIFIED REPORT

ABSTRACT:   The purpose of the work sponsored by grant AFOSR 80-0061 was to study the highly exoergic gas phase reactions of boron atoms. The main goal of these studies is to obtain a basic understanding of exoergic reactions of non metal atoms. These types of reactions play a fundamental role in fields such as combustion, plasma chemistry, laser induced chemistry and chemical lasers. We have completed rate and chemiluminescence studies of boron atom reactions with most of the important oxygen containing molecules of interest. From the results of these studies we are now able to suggest a qualitative model that may explain the nature of these reactions.   (U)
DESCRIPTORS: *Laser induced fluorescence, *Chemiluminescence, *Boron, *Reaction kinetics, Atomic structure, Nuclear reactions, Gases, Phase studies, Metals, Chemical lasers, Models
IDENTIFIERS: Gas phases, Atomic reactions, WUAFOSR2303B1, PE61102F   (U)

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 705   12/1

NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING SCIENCE AND APPLIED MATHEMATICS

First Passage Times in Stochastic Differential Equations of Mathematical Physics and Engineering.   (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 83   9P   Matkowsky,Bernard J. ;
CONTRACT: AFOSR-78-3602
PROJ: 2304
TASK: A4
MONITOR: AFOSR TR-83-0693

UNCLASSIFIED REPORT

ABSTRACT:   The effects of random (stochastic) perturbations on deterministic dynamical system were considered including the effects of noise on deterministic dynamics (such noise exists in all physical systems), and specific physical effects, the details of which are very complicated, and are modeled as stochastic terms.   (U)
DESCRIPTORS: *Differential equations, *Stochastic processes, Perturbations, Noise, Josephson junctions, Boundary value problems, Determinants(Mathematics), Bibliographies, Abstracts, Physics, Engineering   (U)
IDENTIFIERS: PE61102F, WUAFOSR2304A4   (U)

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 706   20/12   20/3   20/2   9/2

CARNEGIE-MELLON UNIV PITTSBURGH PA

A Program of Research on Microfabrication Techniques for VLSI Magnetic Devices.   (U)

DESCRIPTIVE NOTE: Interim progress rept. 30 Sep 81-29 Sep 82,
OCT 82   264P   Kryder,M. H. ;Bauer,C. L. ;Rayne,J. A. ;Guzman,A. ;
CONTRACT: AFOSR-80-0284
PROJ: 2305
TASK: C1
MONITOR: AFOSR TR-83-0685

UNCLASSIFIED REPORT

ABSTRACT:   Means of fabricating, selectively modifying, and characterizing single crystal epitaxial garnet and amorphous magnetic thin films are being investigated with the intention of developing new materials and processes for magnetic devices including bubble, recording, magneto-optic, and micro-wave devices. Submicron ion unimplantable garnets have been developed for ion-implanted contiguous disk devices. A wideband ferromagnetic resonance spectrometer and a high resolution magneto-optic photometer were developed and used to measure the magneto-striction and crystalline anisotropy constants of these materials. It was found that ion implantation dramatically reduces the crystalline anisotropy field and that a large portion of the change in uniaxial anisotropy of garnets is produced by non-stress related mechanisms which became more important as bubble size is reduced. Transmission electron microscopy investigations of ion implanted garnets have revealed clearly observable changes in stress and structure produced by implantation. Amorphous magnetic materials have been developed which support submicrometer sized domains for bubble and magneto-optic device applications. A number of high density bubble devices have been designed and fabricated: 2-4 micrometers period ion-implanted contiguous disk devices, 4-8 micrometer period current-acessed devices, and 2-6 micrometer period current-accessed ion implanted devices with 4 to 16 times lower power dissipation than earlier current-accessed devices. (Author)   (U)
DESCRIPTORS: *Garnet, *Magnetic materials, *Bub   (U)
MEMORIES, *Magnetooptics, Memory devices,

AD-A131 706   UNCLASSIFIED   EVJ43D

## Entry 1

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 704    7/4

MICHIGAN STATE UNIV EAST LANSING DEPT OF CHEMISTRY

Studies of the Correlation of Electrode
Kinetics with Molecular Structure.    (U)

DESCRIPTIVE NOTE: Final scientific rept. Oct 80-Jan
83.
JUN  83    15P    Weaver,Michael J. ;
CONTRACT: AFOSR-80-0271
PROJ: 2303
TASK: A1
MONITOR: AFOSR TR-83-0720

UNCLASSIFIED REPORT

ABSTRACT:    The overall objective is to develop our
understanding of the connections between the kinetics
and mechanisms of heterogeneous electron-transfer
reactions at metal-electrolyte interfaces and the
molecular structure of the reactant and the
interfacial region. We have chiefly focussed
attention on transition metal redox couples,
especially Co(III)/(II), Cr(III)/(II), and
Ru(III)/(II) containing adsorbing inorganic and
organic ligands at a number of electrocatalytic solid
surfaces, especially silver, platinum, and gold, as
well as at mercury electrodes. By combining
electrochemical kinetic and reactant adsorption
thermodynamic measurements, along with in situ
vibrational spectroscopic studies using Surface-
Enhanced Raman Scattering (SERS), the various
catalytic influences exerted by the metal interface
upon the energetics of electrode reactions have been
probed in detail.    (U)
DESCRIPTORS: *Transition metals, *Electrochemistry,
*Molecular structure, Electrodes, Reaction
kinetics, Electron transfer, Raman spectroscopy,
Surface reactions, Ligands, Cobalt, Chromium,
Ruthenium    (U)
IDENTIFIERS:  SERS(Surface-Enhanced Raman
Scattering), PE61102F, WUAFOSR2303A1    (U)

AD-A131 704

## Entry 2

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 698    5/10

NEW MEXICO STATE UNIV LAS CRUCES BEHAVIORAL ENGINEERING
LAB

Visual Accommodation, the Mandelbaum Effect,
and Apparent Size.    (U)

DESCRIPTIVE NOTE: Technical rept.,
NOV  79   139P    Benel,Russell Andrew ;
REPT.NO.  BEL-79-1/AFOSR-79-5
CONTRACT: AFOSR-80-0024
PROJ: 2313
TASK: A4
MONITOR: AFOSR TR-83-0732

UNCLASSIFIED REPORT

ABSTRACT:    The literature concerning the resting
point for accommodation was reviewed. The
physiological and anatomical evidence supporting an
intermediate resting position were covered in
sufficient detail to provide a context within which
the behavioral evidence could be interpreted. The
more recent behavioral research provides strong
evidence for the intermediate resting position and
its pervasive effects on visual information
processing, the present study investigates the
possible development of a functional metric for the
description of stimuli, the effects of varying
quantities of interposed texture on the accuracy of
accommodation to an adequate target at different
optical distances, and shifts in apparent sixe
coincident with changes in accommodation. A
functional metric based on the slope of the
regression line relating accommodation to stimulus
presentation distance appears feasible. Further
development would be required employing a wider range
of objective stimulus characteristics. As stimulus
adequacy (indexed by this functional metric and
percent contrast) declined, the ability of these
stimuli to influence accommodation away from targets
presented at various optical distances declined.
The disruption of accommodation is apparently
related to stimulus adequacy.    (U)
DESCRIPTORS: *Vision, Behavior, Information
processing, Stimuli, Targets, Range(Distance),
Sizes(Dimensions)    (U)
IDENTIFIERS:  Visual accommodation, Myopia,
Mandelbaum effect, PE61102F,    (U)

DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A131 695     4/1     20/6

PITTSBURGH UNIV PA DEPT OF PHYSICS AND ASTRONOMY

OI 630.0 nm Optical Measurements of Neutral
Winds, Temperatures and Airglow Enhancements
during the BIME Program.     (U)

DESCRIPTIVE NOTE: Final rept. 1 Dec 81-31 May 83,
     JUL     83     25P     Biondi,Manfred A. ;
CONTRACT:  AFOSR-82-0055, NSF-ATM81-21723
PROJ:  2310
TASK:  A2
MONITOR:  AFOSR  TR-83-0711

UNCLASSIFIED REPORT

ABSTRACT:     A 100 mm aperture, field-widened
Fabry-Perot interferometer was used in support of
the B.I.M.E. F-region chemical release
program to measure 630.0 nm night-glow line profiles
and from this to determine the pattern of F-region
thermospheric dynamics (neutral velocity vector vn
and neutral temperature Tn versus time) from 24
Auguest 1982 to 19 September 1982 at Natal
Brazil. A 3-channel, sky-mapping filter
photometer measured the temporal and spatial
evolution of the 630.0 nm airglow enhancement
produced by the first B.I.M.E. release (8
Sept. 1982). Clouds over our observing site
obscured the second B.I.M.E. release (13
Sept. 1982). (Author)     (U)
DESCRIPTORS:  *Fabry Perot interferometers,
*Airglow, F region, Doppler effect, Chemical     (U)
reactions, Wind, Neutral     (U)
IDENTIFIERS:  PE61102F, WUAFOSR2310A2

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DTIC REPORT BIBLIOGRAPHY     SEARCH CONTROL NO. EVJ43D

AD-A131 691     20/9     20/5

BROWN UNIV PROVIDENCE RI DIV OF ENGINEERING

Time Dependent Pulse Amplification in a
Three Level Gas.     (U)

DESCRIPTIVE NOTE: Progress rept. 1 Jan-31 Dec 80,
     DEC     80     47P     Morse,T. F. ;Tsai,Tsung-
     Ming ;
CONTRACT:  AFOSR-79-0052
PROJ:  2301
TASK:  A1
MONITOR:  AFOSR  TR-82-0175

UNCLASSIFIED REPORT

ABSTRACT:     The time dependent density matrix
equations have been solved in conjunction with the
field amplitude equations for a three level optically
pumped gas. The solutions are valid in the limit in
which the pumping pulse is longer than the dephasing
time of the system and true coherent effects may be
neglected. It is assumed that the FIR field is
smaller than the pump field, and saturation effects
associated with this field are absent. In the limit
in which the pump pulse is resonant, particularly
simple results for the FIR field amplification may
be obtained. The solutions exhibit the dependence
of the FIR output pulse on the shape of the input
pulse. Further, as a consequence of non-linear
saturation effects on the pump pulse transition, the
FIR pulse is initially created with two peaks, one
associated with the leading edge and one with the
trailing edge of the pump pulse. As amplification
on the FIR transition and pump absorption increase,
these two peaks merge.     (U)
DESCRIPTORS:  *Argon, *Laser pumping, *Pulse
amplitude, Gas dynamics, Optical pumping, Pulse
rate, Nonlinear differential equations, Mathematical     (U)
analysis     (U)
IDENTIFIERS:  PE61102F, WUAFOSR2301A1

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 682       12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

Limit Theorems for the Eigenvalues of Product
of Two Random Matrices.                            (U)

DESCRIPTIVE NOTE: Technical rept.,
     DEC  82    29P     Yin,Y. Q. ;Krishnaiah,P.
R. ;
REPT. NO.: TR-82-39
CONTRACT: F49620-82-K-0001
MONITOR: AFOSR TR-83-0697

          UNCLASSIFIED REPORT

ABSTRACT:   In this paper, the authors showed that
the spectral distributions of a sequence of the
products of random matrices will tend to a
distribution function in the limit as the number of
variables tend to infinity.                        (U)
DESCRIPTORS: *Eigenvalues, *Distribution functions,
*Matrices(Mathematics), Random variables,
Theorems, Graphs, Infinite series, Wishart
matrices                                           (U)
IDENTIFIERS: Spectral distributions,              (U)
WUAFOSR2304A5, PE61102F

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVJ43D

AD-A131 681       20/5

STANFORD UNIV CA HIGH ENERGY PHYSICS LAB

Gain Measurement on the ACO Storage
Ring.                                              (U)

DESCRIPTIVE NOTE: Interim rept.,
     MAR  81     7P      Deacon,D. A. G  ;Madey,
J. M. J. ;Robinson,K. E. ;Bazin,C. ;
Billardon,M. ;
CONTRACT: F49620-80-C-0068
PROJ: 2301
TASK: A1
MONITOR: AFOSR TR-83-0698

          UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:  Presented at the Particle
     Accelerator Conference, 1981.
ABSTRACT:    We report the results of the first gain
measurements on the free electron laser being
assembled on the storage ring ACO. The largest
measured peak gain, averaged over the laser mode, is
G = 4.3 x 10 to the -4 per pass. No laser induced
bunch lengthening is observed within the experimental
accuracy of 50 psec under a laser intensity of 1.6
kw/squared cm and under the conditions of strong
anomalous bunch lengthening (ot/ot (I=0)) = 6.8 -
4.2. (Author)                                      (U)
DESCRIPTORS: *Lasers, *Power gain, Continuous wave
lasers, Argon lasers, Free electrons, Rings,
Storage, Measurement, Peak power, Visible
spectra, Signal to noise ratio, Laser beams, Test
equipment, Detectors, Diodes, Signals,
Photoconductivity, Particle accelerators, Franc   (U)
IDENTIFIERS: Undulators, WUAFOSR2301A1,            (U)
PE61102F

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 676    7/3    20/13

DELAWARE UNIV NEWARK DEPT OF PHYSICS

Synthesis and Low Temperature Specific Heat of the Graphite Intercalation Compounds KHgC4 and KHgC8.    (U)

80    11P    Alexander,M. Grayson ; Goshorn,David P. ;Guerard,D. ;Lagrange,P. ; Makrini,M. El ;
CONTRACT: AFOSR-77-3397
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0643

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Synthetic Metals, v2 p203-211 1980.
Reprint: Synthesis and Low Temperature Specific Heat of the Graphite Intercalation Compounds KHgC4 and KHgC8.

DESCRIPTORS: *Pyrolytic graphite. *Mercury compounds, *Synthesis(Chemistry), *Physicochemical properties, Potassium compounds. Low temperature, Specific heat, Reprints    (U)
IDENTIFIERS: Graphite intercalation compounds, *Mercurographitides. WUAFOSR2306C3. PE61102F    (U)

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 671    11/6    7/4

BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY

Metal Framework Arrangements in Pentanuclear Gold-Ruthenium Clusters. Crystal Structures of (Au2Ru3(Micron² S)(CO)8(PPh3)3) and (Au2Ru3(Micron-H)(Micron3-COMe)(CO)9(PPh3)2),    (U)

83    17P    Farrugia,Louis J. ;Freeman, Mark J. ;Green,Michael ;Orpen,A. Guy ; Gordon,F. ;
CONTRACT: AFOSR-82-0070
PROJ: 2303
TASK: B2
MONITOR: AFOSR TR-83-0706

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallic Chemistry, v249 p273-288 1983.
Reprint: Metal Framework Arrangements in Pentanuclear Gold-Ruthenium Clusters. Crystal Structures of (Au2Ru3(Micron3-S)(CO)8(PPh3)3) and (Au2Ru3(Micron-H)(Micron3-COMe)(CO)9(PPh3)2).

DESCRIPTORS: *Metal compounds, *Crystal structure. *Clustering, Gold, Ruthenium, Chemical bonds, Molecular structure, Reprints    (U)
IDENTIFIERS: PE61102F, WUAFOSR2303B2    (U)

AD-A131 669    7/3    7/4

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

Electrochemical Oxidation of Aromatic
Compounds Adsorbed on Platinum Electrodes.
The Influence of Molecular Orientation,    (U)

83    10P    Soriaga,Manuel P. ;Stickney,
John L. ;Hubbard,Arthur T. ;
CONTRACT: AFOSR-81-0149
PROJ: 2303
TASK: A1
MONITOR: AFOSR TR-83-0701

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Electroanalytical
Chemistry, v144 p207-215 1983.
Reprint: Electrochemical Oxidation of Aromatic
Compounds Adsorbed on Platinum Electrodes. The
Influence of Molecular Orientation.

DESCRIPTORS: *Aromatic compounds, *Electrochemistry,
*Orientation(Direction), Electrodes, Platinum,
Oxidation, Surface reactions,
Solutions(Mixtures), Concentration(Chemistry),
Reprints    (U)
IDENTIFIERS: PE61102F, WUAFOSR2303A1    (U)

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AD-A131 670    19/4    8/11    8/7

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE
CENTER

Studies of Absorption in Salt.    (U)

DESCRIPTIVE NOTE: Final rept. 1 Dec 81-30 Nov 82.
FEB 83    50P    Tittmann,B. R. ;
REPT. NO. SC5320.5FR
CONTRACT: F49620-82-C-0015, DARPA Order-4400
PROJ: 2309
TASK: A1
MONITOR: AFOSR TR-83-0682

UNCLASSIFIED REPORT

ABSTRACT:    As result of recent studies, it has
become apparent that most available data on free-
field particle motion associated with underground
chemical and nuclear explosions exhibit nonelastic
behavior even at rather large scaled distances from
the source. This observation casts suspicion on the
usefulness of reduced displacement potential (RDP)
calculations based upon these close range data for
the purpose of defining a seismic source function
(Bache et al, 1981). Experimental measurements on
sandstone and igneous rocks indicate significant
nonlinearity at intermediate strain amplitudes 10 to
the minus 4th power and 10 to the minus 6th power.    (U)
DESCRIPTORS: *Underground explosions, *Absorption,
*Rock salt, *Seismic waves, Petrography, Wave
propagation, Attenuation, Linearity, Elastic
waves, Microstructure, Pressure    (U)
IDENTIFIERS: PE62147E, WUAFOSR2309A1    (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 661    20/9

BOSTON COLL CHESTNUT HILL MA

Strong Coupling Effects on Bound States in Plasmas.    (U)

DESCRIPTIVE NOTE: Interim progress rept. no. 2, 1 Feb 82-31 Jan 83,

MAR 83    11P    Kalman,Gabor J. ;
CONTRACT: AFOSR-81-0091
PROJ: 2301
TASK: A8
MONITOR: AFOSR TR-83-0637

UNCLASSIFIED REPORT

ABSTRACT:    Further progress in the areas of (1) kinetics and response of strongly coupled multi-component plasmas, (2) study of plasma phase transition and determination of the degree of ionization of a dense plasma, and (3) generalization of the Thomas-Fermi-Debye-Huckel scheme for strongly coupled plasmas with atoms and ions. is reported: A multi-species formalism has been worked out. Details of the phase transition and of the critical curve have been found. Relationship to other works has been studied. (Author)
DESCRIPTORS: *Plasmas(Physics),
*Coupling(Interaction), *Dense gases, Research management, Kinetics, Ionization, Atoms, Dielectrics, Equilibrium(General), Plasma oscillations, Energy levels
IDENTIFIERS: WUAFOSR2301A8, PE61102F

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DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 668    20/3    7/2

DELAWARE UNIV NEWARK DEPT OF PHYSICS

Low Temperature Specific Heat and Low Field Magnetic Susceptibility of Second Stage NiCl2- and FeCl3-Graphite Compounds.    (U)

80    4P    Onn,David G. ;Alexander,M. Grayson ;Ritsko,J. J. ;Flandrois,Serge ;
CONTRACT: AFOSR-77-3393
PROJ: 2306
TASK: C3
MONITOR: AFOSR TR-83-0642

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:    Pub. in Physical Review B, v22 4535 p44-45 1980.
Reprint: Low Temperature Specific Heat and Low Field Magnetic Susceptibility of Second Stage NiCl2- and FeCl3-Graphite Compounds.

DESCRIPTORS:   *Nickel compounds, *Iron compounds, *Chlorides, *Graphite, Low temperature, Specific heat, Magnetic properties, Pyrolytic graphite, Reprints
IDENTIFIERS: Intercalation compounds, PE61102F, WUAFOSR2306C3

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(U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 650    8/13    20/12

CALIFORNIA UNIV DAVIS DEPT OF CIVIL ENGINEERING

In Situ Characterization of Soils for
Prediction of Stress Strain Relationship of
Soft Clay.    (U)

DESCRIPTIVE NOTE: Annual rept. Aug 81-Aug 82,
    NOV 82   129P    Arulanandan,K. ;Anandarajan.
A. ;Dafalias,Y.F. ;Herrmann,L. R. ;
CONTRACT: AFOSR-81-0218
PROJ: 2307
TASK: C1
MONITOR: AFOSR TR-83-0680

UNCLASSIFIED REPORT

ABSTRACT:    An electrical method of characterizing
    fine grained soils is described. A nondestructive
    method of determining the stress-strain behavior of
    fine grained soils is developed based on this
    fundamental characterization of soils. A bounding
    surface plasticity model is used for the prediction
    of stress-strain behavior. Correlations are
    established relating the bounding surface model
    parameters to the appropriate electrical parameters.
    In situ prediction of stress-strain behavior of
    fine grained soils can be made by determining the
    electrical properties using an in situ measuring
    technique in a non-destructive manner and obtaining
    the required bounding surface model parameters from
    the correlations established. The feasibility of
    applying this methodology for predicting the stress-
    strain behavior is demonstrated based on a limited
    number of laboratory experiments performed on
    normally consolidated fine grained soils. (Author)    (U)
DESCRIPTORS: *Soil mechanics, *Stress strain
    relations, *Nondestructive testing, Boundary layer,
    Soil classification, Mechanical properties,
    Composition(Property), Electric fields,
    Methodology, Predictions, Stress analysis,
    Strain(Mechanics), Behavior
IDENTIFIERS: Electrical method, Boundary surface
    model, WUAFOSR2307C1, PE61102F

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 655    7/3    7/4

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

Orientational Transitions of Aromatic
Molecules Adsorbed on Platinum Electrodes,    (U)

Peggy H. ;Hubbard,Arthur T. ;Benton,Clifford
S. ;    82    21P    Soriaga,Manuel P. ;Wilson,
CONTRACT: AFOSR-81-0149
PROJ: 2303
TASK: A1
MONITOR: AFOSR TR-83-0698

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Electroanalytical
    Chemistry, v142 p317-336 1982.
    Reprint: Orientational Transitions of Aromatic
    Molecules Adsorbed on Platinum Electrodes.

DESCRIPTORS: *Aromatic compounds, *Chemisorption.
    *Electrodes, *Electrochemistry,
    Orientation(Direction), Platinum, Adsorption,
    Phenols, Quinones, Molecule molecule interactions,
    Reprints    (U)
IDENTIFIERS: WUAFOSR2303A1, PE61102F    (U)

AD-A131 648      7/4

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

Electrochemistry of Chemisorbed Molecules. 4.
The Effect of Chirality on the Orientation and
and Electrochemical Oxidation of l- and dl-
DOPA.                                          (U)

        83        5P        Chia,Victor K. F. ;
Soriaga,Manuel P. ;Hubbard,Arthur T. ;
Anderson,Stanley E. ;
CONTRACT: AFOSR-81-0149
PROJ: 2303
TASK: A1
MONITOR: AFOSR TR-83-0700

        UNCLASSIFIED REPORT

Reprint: Electrochemistry of Chemisorbed Molecules.
4. The effect of Chirality on the Orientation and
Electrochemical Oxidation of l- and dl-DOPA.

DESCRIPTORS: *Molecular isomerism, *Electrodes,
*Electrochemistry, *Chemisorption, Alanines,
Anodes(Electrolytic cell), Oxidation reduction
reactions, Isomeric transitions, Reprints    (U)
IDENTIFIERS: Enantiomer, Chirality, Alanine/3,4
dihydroxyphenyl, WUAFOSR2303A1, PE61102F      (U)

AD-A131 647      7/4

ROCHESTER UNIV NY DEPT OF CHEMISTRY

Multiphoton Resonances in Molecular
Collisions.                                    (U)

        83        11P        Hutchinson,Michael ;George.
Thomas F. ;
CONTRACT: AFOSR-82-0046
PROJ: 2303
TASK: B1
MONITOR: AFOSR TR-83-0710

        UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical
Chemistry, v87 n12 p2037-2045 1983.
Reprint: Multiphoton Resonances in Molecular
Collisions.

DESCRIPTORS: *Molecule molecule interactions,
*Collisions, *Resonance scattering, Lasers,
Theory, Spectrum analysis, Mathematical models,
Reprints                                       (U)
IDENTIFIERS: LIRS(Laser Induced Resonance
Scattering), Photon scattering, WUAFOSR2303B1,
PE61102F                                        (U)

DTIC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. EVJ43D

AD-A131 632      9/4      12/1      9/5

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION
AND DECISION SYSTEMS

The Effects of Small Noise on Implicitly                    (U)
Defined Non-Linear Dynamical Systems.

DESCRIPTIVE NOTE: Technical rept.,
     SEP  82   50P      Sastry,Shankar ;
REPT. NO.  LIDS-P-1249
CONTRACT:  AFOSR-82-0258
PROJ:  2304
TASK:  A1
MONITOR:  AFOSR  TR-83-0666

ABSTRACT:     The dynamics of a large class of non-
     linear systems are described implicitly, i.e., as a
     combination of algebraic and differential equations.
     These dynamics admit of jump behavior. We extend
     the deterministic theory to a stochastic theory
     since: (1) the deterministic theory is restrictive;
     (2) the macroscopic deterministic description of
     dynamics frequently arises from an aggregation of
     microscopically fluctuating dynamics; and (3) to
     robustify the deterministic one in the limit that the
     intensity of the additive white noise tends to zero.
     We study the modelling issues involved in applying
     this stochastic theory to the study of the noise
     behavior of a multivibrator circuit, discuss the
     limitations of our methodology for certain classes of
     systems and present a modified approach for the
     analysis of sample functions of noisy non-linear
     circuits.                                               (U)

DESCRIPTORS:  *Nonlinear systems, *Noise,
*Algebraic functions, *Differential equations,
*Multivibrators, Stochastic processes, Systems
engineering                                                  (U)
IDENTIFIERS:  Bifurcation, Jump behavior,
Nonlinear circuits, Laplaces method, PE61102F,
WUAFOSR2304A1                                                (U)

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